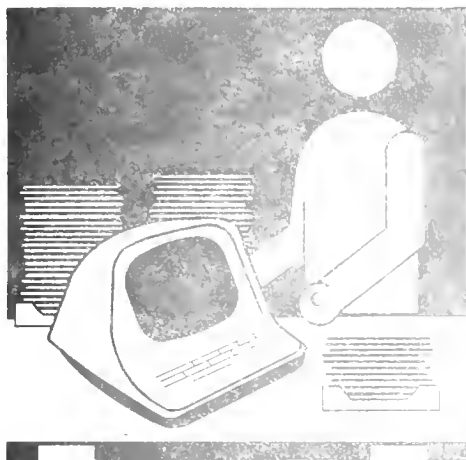A NEW PERSPECTIVE
IN INSTITUTIONAL
ANALYSIS: THE
LEGAL-INSTITUTIONAL
ANALYSIS MODEL
(LIAM)

INSTREAM
FLOW
INFORMATION
PAPER: NO. 23

Biological Report 86(9)
September 1986

INSTREAM FLOW
AND AQUATIC
SYSTEMS GROUP
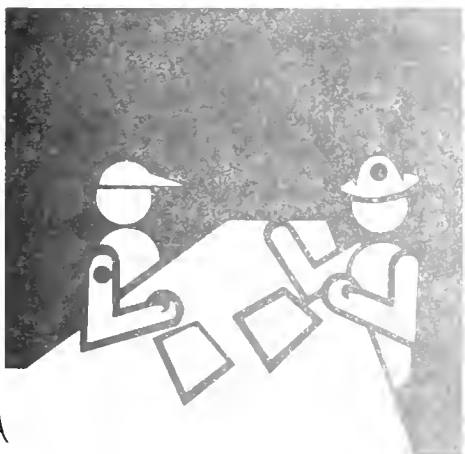
A NEW PERSPECTIVE IN INSTITUTIONAL ANALYSIS:
THE LEGAL-INSTITUTIONAL ANALYSIS MODEL (LIAM)

Instream Flow Information Paper No. 23

by

Leah J. Wilds
Instream Flow and Aquatic Systems Group
National Ecology Center
U.S. Fish and Wildlife Service
Fort Collins, Colorado 80526-2899

This report should be cited as:

Wilds, L. J. 1986. A new perspective in institutional analysis: the Legal Institutional Analysis Model (LIAM). Instream Flow Information Paper 23. U.S. Fish Wildl. Serv. Biol. Rep. 86(9). 143 pp.

CONTENTS

FIGURES

ACKNOWLEDGMENTS

1. INTRODUCTION

Media commentators have long recognized that the United States moved into the environmental decade of the 1970's on a tide of optimism; there was a general feeling that, once initiatives were begun and programs established, over 100 years of pollution could be cleaned up quickly. Now, only 10 years later, it is clear that such a monumental task will be neither "easy" nor "cheap" (Rosenbaum 1985).

A number of steps have been taken. The legacy of the seventies is a variety of Federal and State environmental laws [e.g., the National Environmental Policy Act (1969); the Surface Mining and Control Reclamation Act (1977); the Federal Water Pollution Control Act (1972, 1977); the Endangered Species Act (1973); the Fish and Wildlife Coordination Act (1958); the Toxic Substances Control Act (1976); the Resource Conservation and Recovery Act (1976); and the Comprehensive Environmental Response, Compensation and Liability Act (1980)]. These laws reflect a desire not only to clean up and manage America's natural resources, but also to develop protective programs that would ensure future maintenance of those resources and allow industry and development to proceed at a pace and in a manner compatible with--or at least not detrimental to--natural ecological systems. Implementation of these programs, however, has been extremely difficult, with costs high and frustration the inevitable result. Moreover, technological advances have not been able to meet the challenges presented in the implementation process. Jurisdictional confusion and litigation have frequently been the result. The trend towards litigation has stemmed in large part from the need to interpret the various laws; resolve agency, organizational, and individual disputes; and clarify the roles of economics and science in such complex areas as cost-benefit analysis and risk assessment (Anderson 1973; Brown 1980; Lester and Bowman 1983). The conflicts which arise in the course of resolving these disputes are part of an overtly political struggle.

The struggle is over who gets what societal benefits and services (Lasswell 1936) as these "values" are distributed in projects, permits, licenses, and programs. Such policy determinations are made, implemented, assessed, and adjusted in a complicated environment of technical analysis and political trade-offs. Indeed:

> No domain of public authority ... has expanded more rapidly, nor has any embraced more ambitious goals, than has environmental regulation in the last decade .... This expansion ... while most visible at the Federal level, has ... permeated lower levels of government until ecological issues are [now] routine agenda items for [all levels of] government. [In essence], we are depending primarily upon the Nation's governments, and the political structures

1

in which they are embedded, to assume leadership in environmental management and responsibility for future environmental planning (Rosenbaum 1985:25-26).

The above paragraph suggests a high degree of complexity not only in major policy decisions, but also in small choices made at all levels of government. Governments, whether Federal, State, or local, are involved in defining, implementing, and adjusting policy; the bureaucratic activity that results is confusing to observers and participants alike. Focusing on the decision-making process on a project-by-project basis does little to relieve this complexity. This is more true today, in the 1980's, than ever, and it is as true regarding instream flow protection as any other resource issue. In the instream flow arena, of course, conflict develops over what users get the water that is available--and for what purposes.

An "instream flow" can be defined as that amount of water that is left flowing in a stream or river system. "Instream values" include the following: navigation, water quality, recreation, fish and terrestrial wildlife protection, and aesthetics. Instream flow decisionmaking is characterized by the diversity of organizations that hope to benefit from the development and implementation of policy. Many organizations, both public and private, attempt to influence the outcome of instream flow program implementation efforts in such a way that their respective concerns are addressed; these concerns may be economic, technical, environmental, political, or social. These concerns are frequently misunderstood, even by those directly involved. For example, many applied scientists, involved in collecting and analyzing data, ignore the context in which their recommendations will be considered. Project builders focus on the purely economic costs and benefits involved. Politicians frequently are not instructed by the confusing technical and scientific elements of proposals. And each group has a hard time communicating with the other, while all participate in determining the degree to which a particular river system receives protection.

Three facts seem to stand out amid the confusion that results. First, science or technology alone cannot be depended on to develop all of the necessary solutions. Many disciplines need to become involved in a cooperative effort to resolve the problems associated with instream flow protection.

Second, all environmental policy administration has both technical and political aspects associated with it (Ingram 1984; Lamb 1984a,b). Indeed, some observers suggest that policy implementation is more political than technological (Mann 1982a; Yaffe 1982). Environmental policy implementation occurs in an environment in which "...the medium of exchange...is power and the mode of interaction is negotiation" (Yaffe 1982:7). In spite of all evidence to the contrary, many applied scientists and technicians still believe policy implementation is a fairly simple technical matter (Mann 1982a; Lamb 1984a,b). They frequently do not recognize the political aspects of conflicts in which they become involved. One must understand the political environment in which programs are created and implemented. Technical issues, at this level, are usually less complex than the political and institutional problems involved. Implementation is ultimately a product of interorganizational negotiation (Mann 1982a; Yaffe 1982; Lamb 1984a). This being the case, it is

2

important to develop an adequate understanding of the process of program development and implementation, as well as the organizations that participate in both.

Third, a number of recent research efforts have brought attention to the crucial nature of preassessment techniques for resolving resource problems. One of these research efforts has focused directly on the need for institutional analysis as a first step towards defining and understanding a problem. Institutional analysis is a general term that refers to attempts to understand and explain "those legal, political, and administrative processes and structures" through which public policy decisions are made (Ingram et al. 1982:323; Cortner and Marsh 1986:1-2). This includes rigorous definition of the problem itself and the context in which it will be resolved. Since the determination of water resource decisions and their subsequent implementation involves the active participation of a wide range of organizations, professions, and interests (Bovee 1982), it is important to understand the context in which these groups work, and to understand and plan for the ways in which interactions will occur. Thus, the more rigorous the analysis, the more likely that potential barriers and constraints to instream flow program implementation will be identified. Institutional analysis is most useful, however, when it takes the analyst beyond traditional surveys of the relevant laws and institutions to the assessment of alternative solutions and the development of concrete strategies to achieve desirable results (Daneke and Priscoli 1979; Ingram et al. 1984). Some sort of analytical framework is needed then, and the Legal Institutional Analysis Model (LIAM) has been developed to meet this need.

LIAM is a computerized analytical procedure designed to accomplish four goals. First, it provides a systematic method to diagnose a conflict. The analyst is able, by using LIAM, to answer such questions as: What type of conflict is this likely to be? Will it be an ideological dispute--or a procedural one? Who is likely to dominate the negotiation--and what type of negotiation styles are likely to emerge? In whose favor is the outcome likely to fall?

Second, the model allows an analyst to plan for participation in a negotiation. Here, one could answer such questions as: Where can influence best be exerted? What are the concerns of the various sides to this conflict? What are the likely areas of agreement? Where are alliances likely to form? What types of power does each organization have at its disposal--and to what degree? What communication and negotiation strategies will be most suitable in this context?

Third, the model predicts organizational behavior. Here the analyst can answer such questions as: What is organization "x" likely to do? What is the mix and distribution of organizational types? How likely is compromise among them? Is litigation a possibility? How can compromise be facilitated? To what types of information will organization "x" be most receptive? Given a change in the environment, what will happen to organization "x"? How are the other organizations likely to respond?

Finally, LIAM can be used as a conflict resolution tool. This can be achieved by getting all of the parties to use the procedure to develop a better understanding of the values and needs of other parties; to identify commonalities among them; and to overcome misperceptions. LIAM, in this latter sense, can lead to improved understanding and communication, and can help to move the conflict from a competitive to a noncompetitive environment. LIAM, in short, is presented as part of the answer to increased understanding of the organizations involved in instream flow decisionmaking, and of the nature of the decisionmaking process per se. An organization that develops such an understanding will be in a better position to represent its own interests and values in the process.

The following chapter examines instream flow decisions as they fit into the overall water policy context, and an example is presented of the type of problems usually encountered in instream flow issues. This chapter also surveys the literature on institutional analysis, focusing on instream flow protection. Chapter 3 introduces LIAM and its theoretical underpinnings. Chapter 4 outlines the four phases involved in conducting legal-institutional analyses. In Chapter 5, the computerized version of the model is described, along with specific directions for conducting an LIAM analysis. The final chapter concludes with a discussion of the ways in which LIAM can be used to develop strategies for instream flow protection.

2. INSTREAM FLOW: AN OVERVIEW

Although water is clearly one of this country's most abundant and versatile National resources, the "adequacy of our water resources has emerged as [one of] the nation's principal resource concerns in the 1980's" (Frederick 1982:216). Every geographic region in the United States faces serious water problems, which fall roughly into two major categories: either there is too much demand for too little water, or the quality is low. Instream flow needs are related to both.

Historically, the value of maintaining flow in streams for instream uses has been ignored in favor of development uses. This is especially true in the West, where diversionary and beneficial use is often a prerequisite for obtaining legal rights to the water. In the last decade, however, the environmental movement and other factors led to the creation of a new kind of water use: the use of a free-flowing stream for such purposes as recreation, water quality maintenance, aesthetics, and the preservation of aquatic and terrestrial wildlife (Doerksen and Lamb 1974; Tarlock 1978; Weatherford 1982).

The debate over instream flows centers on the crucial question: How much water, in what condition, and for what uses, should be left in a particular river or stream? Thus, instream flow allocation is integrally tied to the issues of quantity and quality, as well as the legal and institutional frameworks for managing and regulating each. As the demand for energy, irrigation, and domestic and industrial consumption has increased, more and more streams have been impounded or depleted to provide water for these interests. These long-standing water uses have come into direct conflict with the newly recognized instream values (Doerksen and Lamb 1979; Lamb and Meshorer 1983).

Competition over what is viewed as an increasingly scarce resource, especially in the West, is often fierce (Frederick 1982; Weatherford 1982). Instream users not only have to compete among themselves for water to cover a diverse set of activities (including fish and terrestrial wildlife protection, recreation, flood control, hydroelectric power generation, navigation and transportation purposes, and waste treatment and assimilation), but with offstream users as well. Offstream users also compete with instream users and each other to advance a variety of interests, many of which are incompatible. These include water for agriculture and irrigation, livestock, manufacturing, industry, mining, steam-generated electricity, and a host of commercial and domestic activities (Frederick 1982).

Instream flow questions have no single answer that is suitable in all conflicts. It is not simply a matter of instream flow versus diversionary uses. Determination of instream flow needs is associated with a number of water issues, including (but certainly not limited to): Section 404 dredge

5

and fill permits; hydroelectric licenses; operating schedules for Federal projects, such as dams and diversionary works; waste assimilation capabilities of rivers and streams; environmental impact assessments; mitigation efforts; navigation facilities; recreation; land management planning; State programs for setting initial instream flow standards; the design and implementation of general State instream flow programs; initiating instream flow legislation; and in denials of water rights based on instream flow studies.

Even where instream uses are designated as beneficial, and legal opportunities provided for their protection, the institutional processes involved often present major obstacles to achieve adequate protection for instream values. The problem seems to be more than just a question of which is the more "beneficial" use. While it is true that instream uses are easier to protect if they are legitimized by State law, when this is not the case, other opportunities exist for their protection. Such opportunities are provided in Federal project construction and operation; Federal water rights; endangered species protection; wild and scenic rivers management; Federal Clean Water Act planning; the Fish and Wildlife Coordination Act; and various State laws and protective programs.

Although one of the most basic elements of instream flow determinations concerns the allocation of water among competing users, and hence "water rights," the issue is much more complex than this implies. Solutions are far from simple, no matter what system of water allocation is at work. Conflict initially arises because a multitude of public agencies and private organizations strive to achieve a widely diverse set of goals (Doerksen and Lamb 1974; Lamb and Meshorer 1983). Each instream flow problem tends to be defined, then, by a number of factors, including: the various State and Federal laws that are called into play by the nature of the problem; the interactions of various groups attempting to achieve their own objectives; the particular set of technological problems that need to be resolved; the type of field studies and analyses to be conducted; and the political and institutional circumstances involved.

Allocation of water supplies, both underground and surface, is achieved through a complex arrangement of statutes, regulations, and permit systems carried out by numerous organizations created at all three governmental levels. To date, there has been little effort in developing and coordinating a single regulatory system to control water distribution and use. At the National level, the mechanisms for control are fragmented not only across the three branches (executive, legislative, and judicial), but scattered within each branch as well. For example, in Congress alone, 41 House committees and subcommittees, along with 31 in the Senate, all have some authority over National water policy planning. Furthermore, four different Federal agencies, each located in different departments, have major responsibilities for water management (Rosenbaum 1985). (These include the Bureau of Reclamation (Interior); the Soil Conservation Service (Agriculture); the Army Corps of Engineers (Defense); and the Tennessee Valley Authority.) Although such dispersion of responsibility and authority obscures the interrelatedness of the various policy areas and obstructs coordinated planning, new statutes are written and existing statutes implemented in such a way that fragmentation and inconsistency seem inevitable. The ambiguity that results is seen by some as

permitting a high degree of much-needed administrative discretion and flexibility (White 1971). Ambiguity may even present opportunities, if correctly handled; however, many individuals directly involved in the implementation of different State instream flow programs are frequently frustrated by the apparent lack of consistency.

The States have developed their own mechanisms for distribution, which tend to reflect the wide variation among the States in water law, supply, demand, public attitudes, and historical precedent (Mann 1982b). In the West, the "appropriation doctrine" was originally adopted, while in the Eastern States the "riparian doctrine" has dominated. Although modifications of both doctrines have appeared in practice, these two doctrines still form the basic foundations of Eastern and Western water law as we see them today (Gould 1977; Meyers and Tarlock 1980; Davis 1983). A brief review of these doctrines then, is necessary to fully appreciate the current state of affairs in instream flow protection.

2.1. THE WEST: APPROPRIATION

The first major use to which water was put in the West was in mining, followed soon after by irrigation. Both require the removal of water from the streambed, with the return flow often far less than the amount diverted. Since water is scarce in the arid West, not enough was available to meet the demands of all those desiring to use it. These basic facts gave rise to the three fundamental principles of the appropriation doctrine: the priority rule, the diversionary requirement, and the beneficial use requirement (Dewsnup and Jensen 1977b; Tarlock 1978; Mann 1982b).

The priority rule states that the first appropriator on a stream has the prior right to use the water: "first in time, first in right" (Mann 1982b:24). Thus, appropriative users are classified according to the dates on which each began to use the water. In times of shortages, the most junior (i.e., latest appropriation date) users may be required to cease operations, while the most senior users continue to have the right to use the water.

The diversionary requirement that water physically be removed from the stream results from the fact that the first major and competitive water needs were associated with diversionary activities. Diversions were also viewed as a practical means for determining priority, since diversionary structures served as physical evidence of the priority of the water right. The diversionary requirement presented a major obstacle in early attempts to keep the water instream (Dewsnup and Jensen 1977b; Tarlock 1978).

Scarcity of water supplies also contributed to the development of the third principle, that appropriated water be put to a "beneficial use." The amount of water to which a user is entitled is no more than the amount that can be put to a beneficial use. Failure to do so results in loss of the appropriative right to the water by forfeiture or abandonment. "Beneficial" uses, of course, were traditionally economic and developmental, as the mining and irrigation customs became incorporated into common and statutory law (Gould 1977; Tarlock 1978; Meyers and Tarlock 1980; Mann 1982b).

The appropriation doctrine in general reflects the struggle in the American West to protect the "certainty" or dependability of water rights and to "fix" the relative positions of users. The ultimate result of these forces has been the development of a "consumptive ideology," which perpetuated the notions that: (1) water not used is wasted or lost; (2) only economic, diversionary uses are beneficial; and (3) individuals have the right, if all other requirements are met, to use the alloted amount of water no matter what conditions prevail (Lamb 1980b; Mann 1982b). Currently, the appropriation doctrine requires meeting five standards: (1) intent to appropriate; (2) notice of such intent; (3) adherence to State laws; (4) diversion or physical control of the water; and (5) application to a beneficial use (Gould 1977; Huffman 1983). The latter two requirements have long stood as historical road blocks to the preservation of instream flows. The law has moved beyond the necessity of capture as the basis of a Western water right, however, and now capture tends to be justified only when it serves some clear resource allocation function (Tarlock 1978). Indeed, most contemporary Western water law experts recognize that the actual diversion requirement serves no real function today that cannot be otherwise achieved through statutory procedures (such as permit systems) (Tarlock 1978).

Western water law adopted the view that "inefficient" or cost-ineffective water use could only be controlled or eliminated through the beneficial use requirement. Since the economic benefits of instream values were difficult to determine and document, instream uses were traditionally regarded as grossly inefficient and thus denied in favor of other claimants, such as energy developers. In light of current widespread acceptance of instream values, however, instream uses of water have increasingly come to be recognized in State statutory schemes as "beneficial" (Tarlock 1978; Meyers and Tarlock 1980).

Since the early seventies, Western States have made rapid, creative adjustments in water rights systems to accommodate changing needs (Mann 1982b). While there continue to be conflicts, four major types of instream flow programs have emerged among the Western States (Dewsnup and Jensen 1977b). First, several Western States have adopted instream flow reservation systems, wherein a basic flow level is set aside below which no new water rights can be granted. These reservations have the date of enactment as the priority date. Water rights senior in time to the reservation are not affected. Persons who desire to obtain a water right after the date of reservation may use water only when the reserved flow is satisfied. Additionally, all prior users get to use the water before the reservation is satisfied. Enforcement provisions vary among the States using this technique, but the basic idea is the same: some percentage of a stream's flow is reserved from all subsequent out-of-stream use (Dewsnup and Jensen 1977b; Lamb and Meshorer 1983).

Second, some Western States have developed, by statute, specific stream flow appropriation systems. Instead of reserving water from future use as is the case with reservations, the appropriation system grants an appropriative water right for a given instream use. The States that employ this mechanism provide that only a designated State agency may hold these water rights; there have been, however, a few instances of individuals holding instream use water rights (Tarlock 1978; Lamb and Meshorer 1983).

Third, many Western States allow for an administrative agency to "condition" new water rights to protect flows on behalf of instream values or the public interest. In most of these States, when an application is made for a water right, the application is reviewed by concerned agencies. One consideration is the maintenance of instream uses. To ensure proper flow regimes, the conditions are often attached to a new permit for a water right so that the water right holder may not use the water if (when) it drops below a specified flow (Tarlock 1977; Lamb and Meshorer 1983).

Fourth, a number of States have instituted State-level protected rivers programs, in which rivers are classified as wild and/or scenic. These designations typically specify that future withdrawals of water are either limited or prohibited altogether (Tarlock 1978; Lamb and Meshorer 1983).

Various of other innovative methods for instream flow protection have been devised and successfully implemented in the West; at the Federal level, the opportunity exists for States to participate in the National Wild and Scenic Rivers program (P.L. 94.486). Some of these include: conditions on transfers and exchanges of water rights, or even the prohibition of both; permits for a designated period of time only, not in perpetuity, which revert back to the State at the end of that period; and the acquisition and reallocation of existing water rights through purchase or condemnation. In addition, a number of strategies have been developed in synchronization with the implementation of State and Federal water quality programs (Dewsnup and Jensen 1977a); the State police powers to protect the health, safety and welfare of its citizens (Huffman 1983); and the gradual expansion of the definition of navigability (Dewsnup and Jensen 1977a; Tarlock 1978).

2.2 THE EAST: RIPARIAN RIGHTS

Riparian rights are also rights associated with the use of the water--rather than "ownership" of the water in question--but no diversion or actual use of the water is required. This doctrine was adopted from 19th century practices in England and seemed suitable for the eastern part of the United States, given the abundant water supplies there. Under the riparian doctrine, water rights are obtained by contiguous ownership of the land touching the water (Cunningham 1973; Davis 1982). Each riparian landowner is entitled equally to the water. Initially, this meant riparian users were absolutely entitled to have the water flow along their property "undiminished in quantity or quality" (Cunningham 1973:181; Davis 1982:47-80; Lamb and Meshorer 1983: 1-17), even if the water was not being used. This rule seemed quite appropriate, since in the humid East, diversionary irrigation was unnecessary and mining was not a major industry. Outside of domestic uses, moreover, the primary need for water during the 19th century was to power mill wheels. With the natural flow requirement mill owners were assured of enough continuous flow to satisfy this need (Davis 1982). Only a few Eastern States, however, currently adhere to this rule. In other areas, the rule has been modified to provide that "reasonable" uses be made of the water in a stream system, a principle that seeks to promote the fullest riparian use of the water.

The reasonableness of a use is determined by the character of the stream, the present conditions, and the location of users relative to each other. Thus, it is a comparative sort of reasonableness and tends to be determined by the courts on a case-by-case basis (Davis 1982). The courts have thus come to play an instrumental role in protecting instream values, although it has been a long and cumulative process.

Four major court-created protection strategies have emerged. First, there has been a trend towards recognition of private recreational uses as "reasonable" under the riparian doctrine. Second, the courts have moved towards protecting the waste assimilation capacities of streams under a variety of State and Federal water quality control programs. Third, the courts have been useful in protecting some element of natural flows on behalf of both mill owners and metropolitan water supplies. Fourth, the courts have begun to recognize the public interest right to protect streamflows on behalf of recreation, aesthetics, and boating (Davis 1982).

Eastern States have also been successful in initiating programs of their own, especially in the last decade. In some States, for example, flow standards have been set that limit the ability of riparian users to take water in times of short supply. Streams and rivers have also been assigned, either by State statute or administrative ruling, a "protected" status, as has been the case under the appropriation doctrine in the West. A number of Eastern States have begun to implement permit systems or to condition the operation of existing and future dams so as not to affect minimum flow standards set for instream values. Other States have incorporated priority systems, either in State laws or within an administrative permit system. In this latter instance, uses are categorized according to types of use (e.g., domestic, industrial, water supply) and ranked in priority of use rights. In times of shortages, the lower categories are required to reduce the amount of water being used, or to stop use altogether. Increasingly, instream uses are being included in these categorization schemes (Aiken 1983; Ehrlich 1983; Ertl 1985).

In both the West and the East, then, opportunities do exist for protecting instream flows; however, the degree of success encountered varies from State to State and program to program. This is because, in practice, instream flow protection efforts frequently involve controversy and lead to conflicts among competing values and goals. The degree to which these conflicts are success-fully resolved shapes the nature of the outcome. The key to successful protection of instream uses is to negotiate permits and standards that give adequate consideration to both viable economic interests in water resources and instream values. This is a process that involves bargaining--and compromise--among the interested parties to a conflict (Lamb 1980b).

Instream flow resource problems have many nontechnical aspects that are not sufficiently understood. Indeed, the political, legal, and institutional facets of instream flow issues are often more complex than the technical ones. It is in this regard that a dynamic, flexible tool for evaluating these elements can be highly useful. An example may help illustrate this point.

2.3 THE CEDAR RIVER

In 1972, steelhead anglers caught 278,927 steelhead in the State of Washington rivers; 1,224 of these seagoing trout were caught in the Cedar River. This does not seem like a lot of fish, however, to these fish add the 5,000 to 15,000 chinook, 30,000 to 150,000 coho, and 50,000 to 200,000 sockeye salmon that are produced in the Lake Washington system, of which the Cedar River is a part. All of these fish depend on the Cedar River either for spawning waters or for fresh water inflow to the lake during rearing. It is estimated that the fishery in the Lake Washington-Cedar River system, with no artificial propagation, could easily produce in excess of two million fish annually (Beckett and Lamb 1976).

The importance of the fishery can be appreciated when one considers the following facts. Lake Washington is surrounded by the City of Seattle and its suburbs. Accessible portions of the Cedar River are within a few minutes' drive of metropolitan Seattle. The lake is commercially fished and the Cedar River receives heavy recreational use. In addition to supporting these values, the waters of the Cedar River provide an important water supply; the City of Seattle draws 70 percent of its water from the Cedar River. The city owns 81 percent of the Cedar River watershed; pipes from the point of diversion travel only 30 miles to the city limits.

In the State of Washington, the Department of Ecology (DOE) is authorized by statute to establish minimum or base flows by administrative procedure after public hearing. In such a situation, the Department of Ecology becomes the arbitrator among the agencies representing various uses of the stream. Under Chapter 90.22 of the Revised Code of Washington, the State Fisheries or Game Department, among others, can initiate administrative action by requesting certain minimum flows for a stream system (Beckett and Lamb 1976).

The procedure to establish administrative policy regarding the Cedar River was initiated by the State Department of Fisheries on August 5, 1969. The department requested that the Department of Ecology set minimum flows to protect fisheries resources. The Department of Fisheries recommended certain minimum flows in a chronological regime--that is, minimum flow requirements were recommended for different conditions and times of the year--and indicated that the Department of Game and the Water Pollution Control Commission (now part of the Department of Ecology) concurred in these recommendations.

Between August 5, 1969, and February 5, 1970, both the Department of Fisheries and the Department of Game revised their requests on the basis of further analysis. At a hearing on May 22, 1970, the Department of Game requested an additional modification of its recommendation. Several agency representatives testified at the hearing, including the Department of Fisheries, the Department of Game, the Department of Water Resources, the City of Seattle, the Municipality of Metropolitan Seattle (METRO), the Puget Sound Gillnet Association, and the Puget Sound Governmental Conference (now known as the Puget Sound Council of Governments). Additional statements were received from the U.S. Fish and Wildlife Service and the Corps of Engineers.

11

Several salient facts emerged. First, the Department of Fisheries and the Department of Game had submitted flow recommendations that varied only marginally. Second, the Department of Water Resources recommendation was less specific but generally paralleled those of the other State departments. Third, the City of Seattle recommended a substantially lower flow regime. The city's proposals were consistently about a third lower than those of the Department of Fisheries, e.g., from October 11 to May 1, Fisheries requested 435 cubic feet per second, while the city recommended 290 cubic feet per second from November 1 to May 1. The administrative regulation subsequently promulgated by the Department of Ecology followed rather closely the Department of Fisheries' recommendation.

The city later argued that 435 cubic feet per second exceeded the natural flow of the Cedar River for that portion of the year. Further, the city claimed that even though it was willing to provide some sort of flow, the authorized flow regime exceeded optimum fish needs. The city commissioned a series of studies, the results of which tended to confirm its position. In addition, the city had always maintained that it had a perfected water right and that the State should be required to purchase storage in the city reservoir to maintain desired flows. This water right claim was based on five facts: (1) in the 1890's, the city installed and maintained a measuring weir on the river above Cedar Falls; (2) in 1895, a city ordinance proposed an election to authorize the city to proceed with development of the river as a water supply; (3) in 1902, the first water was delivered to the city; (4) in 1914, a masonry dam was constructed on the river; and (5) in 1916, over 47 percent of the entire watershed above Landsburg Dam was purchased by the city. Undoubtedly, the city does have a water right, but by 1969 it had not filed with the State for the right, which it was required to do by State law. This left the extent of the city's right in question (Beckett and Lamb 1976).

The call for the hearing in 1970 caught the City of Seattle by surprise. The city first heard about the hearing and the proposed flow regime through a public announcement. There was no advance notification or negotiation. Furthermore, the Department of Fisheries seems to have viewed this as a test of the strength of the law and the willingness of the Department of Ecology to carry through once the process was initiated. Two representatives of the Department of Fisheries indicated that they picked the Cedar River case because it posed a difficult problem. If this problem could be resolved in a manner beneficial to their objectives, it seemed to them that other such scenarios would eventually follow.

The flow regulation ultimately recommended by the Department of Fisheries was promulgated as Washington Administrative Code Chapter 17330. According to several respondents, the standards of the regulation have not been met consistently. The Department of Ecology has been unwilling to strictly enforce the ruling. Since establishment of the flow regime, only one critically short water year has occurred. During that period, representatives of the concerned agencies met regularly to review the data provided by the City of Seattle and to negotiate the actual flow level to be maintained. Subsequently, such a renegotiation process became the standard practice, even in normal water years, since the interested parties got together during each summer to negotiate their differences. At these "low flow" meetings, information on historical

flows in the river was provided by the City of Seattle. Even though other agencies had data on stream flow, the city maintained the most comprehensive record of historic flows and current conditions. It was thus the city to whom agencies had to turn for reliable information on which to base their individual negotiating positions. The flow regime established by the Department of Ecology has not been maintained for a number of reasons. Primarily, the city adjusted outflow from its impoundments on the basis of natural inflow, water quality, and consumptive demands on the water. The city was unwilling to release more than the natural inflow and reluctant to retain turbid water.

These conditions led to confrontation at the semiregular low-flow-period meetings. Representatives from both the city and the Department of Fisheries indicated that the Department of Fisheries is frustrated by the inability of the city to meet the flow regime and the unwillingness of the Department of Ecology to enforce compliance. The city's position is that the Departments of Ecology and Fisheries could purchase water to meet their flow needs. The two departments, on the other hand, insist that the city must provide the flows. There appears to be no practical way to reconcile these demands. The results of these negotiations are that the city usually releases water in a pattern that is generally parallel to, but less than, the flows specified in the DOE flow standards. At the bargaining sessions, the problem tends to be dealt with by continually settling for a flow somewhere between the city's offer and the legal requirement (Beckett and Lamb 1976).

It would seem that passing a State law designating a single State agency to establish flow standards may not always provide the solution necessary for instream flow protection, especially if that agency is subject to political or other pressures. Even though the agency may initially set flows, confrontation frequently continues between interested organizations, as the parties negotiate on the specific releases. In the present case, the parties have formally kept the controversy open. The city, for example, still threatens a lawsuit to establish its rights and commissions studies to refute the findings of the State departments.

The Department of Ecology was placed in a difficult position from the outset. On the one hand, it was charged with establishing and enforcing flow regimes but, on the other hand, its only attempt to do so has led to continued controversy. The Department of Fisheries has requested that flow regimes be established on 14 other streams under RCW 90.22, but the Department of Ecology has failed to act on a single one of these requests. It was only much later, under a different statute, that the Department of Ecology sought to set flows on other streams.

In this case study, two agencies, the City of Seattle and the State Department of Ecology, seem to have the most potential influence. Seattle owns the impoundments that control the water and, more importantly, owns a majority of the watershed. Seattle could demonstrate the economic benefits to be derived from continuation of past practice and it has staff and research support adequate to support its claims. The Department of Ecology, on the other hand, has control of issuance of water rights in Washington and the statutory responsibility for establishing flow regimes. Neither has been able to force the other to accept a flow policy, yet they must reach agreement on a

flow program. The Department of Fisheries has little money and only indirect authority. For leverage it must rely on the general public interest in protecting the environment and the State's fisheries. It is, however, able to use the expertise of its fishery biologists to good advantage. The department can specify the minimum needs for aquatic life and support its recommendations with extensive field data. The city counters this advantage, however, by hiring its own field researchers. Two different sets of recommendations result, each supported by biological and other relevant data. Thus, the struggle over policy is carried on through the bargaining process.

The point here is that the ultimate flow regimes achieved are not those promulgated by the Department of Ecology. Each agency recommends a flow pattern for the period in question--the low flow period each year--based on its individual perceptions of instream needs. The city uses an amended version of its original estimates, adjusted on the basis of the precipitation conditions peculiar to the period in question. The State departments use the Department of Ecology standards, adjusted on the basis of local conditions. The result is a negotiated settlement for the week, month, or season in question.

Commentary

Although the Cedar River case is but one example, it is typical in many respects. A number of observations can be drawn from Cedar River that apply to other types of instream flow conflicts.

Generally, the outer boundaries of a conflict such as this are set by statute. In some cases, several potentially conflicting statutes are involved. Here, the State legislature passed a law setting the stage for agencies to apply for designation of minimum flows to protect an instream use of the water. The State Department of Fisheries then chose to initiate the process on behalf of the Cedar River fishery resource. Other State agencies supported this move, and indeed it seems this particular case was viewed by the Department of Fisheries and others as not only a test of the strength of the law, but one that, if successful, would set a valuable precedent for similar designations on other Washington streams and rivers. Furthermore, the hydrologic data were available regarding historical flows. It seemed the Department of Fisheries simply needed to initiate the process, backing up its recommendation with technical information and field studies on the available habitat and water requirements for maintaining the fishery. It seemed also that all that was needed beyond this was to persuade the Department of Ecology to accept the recommendations, in which two other State agencies concurred, and promulgate them according to the specifications of the law.

On the surface, success seemed clear--and the Department of Ecology did "promulgate" an administrative rule setting the requested flow standards. Other organizations, of course, were allowed to give testimony at the hearing and to submit counter-recommendations, which the City of Seattle did not hesitate to do. Given its interest in protecting the consumptive water rights of the city, it was not surprising that the city's recommendation was substantially lower than that proposed by the Department of Fisheries. What resulted was a struggle between organizations with apparently conflicting interests, in

which a choice between competing in- and out-of-stream values needed to be made. The Department of Ecology was caught in the middle. This happens frequently in water use conflicts (Lord 1984). Nonetheless, an official standard was set, based on the Department of Fisheries' final recommendation. Many, if not all, of these facts would have been revealed in a traditional assessment of the conflict by any of the organizations involved.

This is because traditional assessments of instream flow issues tend to focus upon surveys of: (1) the statutory environment in which use decisions are to be made, (2) the policies that have developed within that context, (3) the principal actors, and (4) the institutional framework involved. Typical questions addressed include: What statutes apply? Which organizations have what degree and type of authority to participate? Who makes the final decision--and on what basis? What policies have been developed? What organizational structure is in place, if any, for implementation, monitoring, and enforcement? What sanctions apply? The traditional approach has frequently been used to examine water issues, either before or after the fact, and is a crucial first step toward understanding the boundaries within which those seeking to protect instream flows must operate. Many traditional analyses have been undertaken because of the obvious need to document the existing legal and institutional arrangements within a given State or region of the country. Case studies have also been conducted that attempt to assess the degree to which laws have been effective. These case studies tend to be of a critical nature and more often than not suggest ways in which improvements can be made.

In a case like the Cedar River, a formal analysis of this type would have been useful in discovering and explicitly recognizing the basic legal facts and organizations involved. Such analyses are frequently recommended (Minton et al. 1980; Ingram et al. 1984; Cortner and Marsh 1986). Traditional institutional analysis, however, would not have predicted the end result, noncompliance and a never-ending series of negotiations. Nor would it have moved the analyst towards developing strategies useful in avoiding such a scenario.

The Cedar River case demonstrates the type of problems that can arise when a single State agency, without adequately consulting the other impacted organizations (in this case, the City of Seattle), attempts to establish and enforce flows through the promulgation of regulations. Each organization typically pursues its own interest, without consideration of the other interests involved. The ultimate decision reflects either the mutual accommodation of competing positions or the inability, as in this example, of the parties to reach a satisfactory agreement. One of the tests of a successful agreement is the degree of compliance that follows. A high degree of compliance is much more likely to occur when all parties are at least partially satisfied with the agreement (Lee 1982; Wilds 1985).

Traditional assessments, then, tend to reveal only the tip of the iceberg (Ingram et al. 1984). Other questions might have been considered prior to initiating the administrative process for setting a flow regime for the river. It would have been helpful, for example, for the Department of Fisheries to generate information about the ways in which the other organizations, especially the Department of Ecology and the City of Seattle, had interacted

in the past. How had they behaved in similar situations? What powers did each have, aside from those legal ones spe: :ied in the statute? What were some of the likely outcomes? The answers to these ques .ions may well have led the Department of Fisheries to choose a different str tegy than it did. Had the interaction been scoped and defined differently, the Department of Fisheries could have developed tactics to cope with a number of possibilities. If the Department of Ecology had a history of backing down in direct conflicts with the City of Seattle, perhaps a better move would have been to begin communicating with the interested parties well before the public hearing. As it was, the hearing came as a surprise to the City of Seattle.. From that point forward, it seemed the City was out to defend itself vigorously from what it viewed as an unprecedented attack on its water rights.

And what about the original objective of the Department of Fisheries, to "test the strength of the law" (Beckett and Lamb 1976)? It seems that this objective was not wholly compatible with that agency's ultimate goal--long-term protection of the fishery resources in the Cedar River system. Had the Department of Fisheries defined the issue in less threatening terms (rather than depicting it from the outset as the first of a long series of struggles with consumptive users such as the City of Seattle), perhaps communication could have been enhanced (Wilds and Lamb 1985).

Inadequate preparation prior to participating in resource conflicts (such as evidenced in this case study) has become a major obstacle to those working on behalf of instream flow values today (White et al. 1980; Ingram et al. 1984). Indeed, in many cases, no attempt is made at all to examine and define the dynamics of a resource problem prior to becoming involved in its resolution, in spite of an increased emphasis in the literature on the importance of such a task (Ingram et al. 1984).

Recent trends in resource policy literature suggest a number of ways in which preparation for and participation in resource conflicts can be improved. Some of these trends have included calls for more directly applicable policy research (Schlesinger 1968; Rothman 1980; Cortner and Marsh 1986); more politically astute actors on all fronts (Behn 1981; Alston 1983); increased understanding and communication among the professions and disciplines involved in instream flow and other resource conflicts (Alston 1983; Callaham 1984; Haimes 1984); analyses that go beyond an examination of the economic factors involved (Daneke and Priscoli 1979) and that recognize the political nature of most policy issues (Schlesinger 1968; Hipel, Ragade, and Uny 1976; Ingram et al. 1984); and improved methods for analyzing a problem, which go beyond the traditional focus on formal laws and institutional arrangements (Ingram et al. 1984). There is a general lack of guiding theory--ideas that apply no matter what the instream flow issue at hand--in spite of the increased emphasis on the need for specific guidelines. Although commonalties do exist, each instream flow conflict is, because of the differences in participants and type of decision process involved, somewhat unique. What is needed is a systematic method that allows the user to discover the nature of a particular problem; to understand the different perspectives of the organizations involved; to determine the power relationships involved; to predict probable outcomes; and to develop strategies based on those discoveries. The purpose of this paper is to present such a tool. The following chapter discusses the theoretical foundation upon which this tool is built.

3. LIAM: THE THEORY

In this chapter, the theoretical underpinnings of LIAM are examined. These theories represent a long-term attempt by social scientists to document and understand the American policy process and center around five major concepts: incrementalism, decisionmaking arenas, organizational process, group psychology, and bureaucratic politics.

3.1 INCREMENTALISM

Incrementalism as an explanatory decisionmaking model is the result of work by Herbert Simon, Charles Lindblom, and others, which attempts to explain the fundamental nature of policymaking in America (Simon 1957a; Lindblom 1959, 1968; Braybrooke and Lindblom 1963). The incremental view holds that decisions are made serially and are pragmatic efforts to deal with problems, based on past experience, as they arise within the broader decision context defined by statute. Policies developed under general legal guidelines are adjusted bit by bit as those involved become aware of new information, technology, or preferences, or as decisionmakers are faced with new but related dilemmas.

Simon pointed out that, given the uncertainty involved in planning and policy implementation, decisionmakers tend to merely "satisfice." This term refers to attempts to reach decisions that both "satisfy" the participants involved (at least temporarily) and "suffice" to solve the problem for the present time and under the particular situational constraints (Simon 1957a). This notion was further developed by others (Lindblom 1959, 1965, 1968; Wildavsky 1974, 1975). The basic idea is that given the context of an issue, the legal and policy framework currently in place, and the limitations imposed on decisionmakers by time, resources, and information, they generally try to do the best that they can in each instance. Satisficing is contrasted to another decisionmaking model, rational-comprehensive decisionmaking, which Simon and others felt was the most appropriate method for making policy decisions. In this second model, the ideal method for making decision choices involves the following:

(1) clarification of values and objectives prior to and distinct from the scientific analysis of alternative choices;

(2) a means-end analysis, in which the ends are isolated and the means to achieve them are sought;

(3) the best measure of a "good" policy is that it can be shown to be the most appropriate means to the chosen ends;

(4) all analyses are comprehensive--that is, every important factor is taken into account; and

(5) theory is frequently utilized (Lindblom 1959).

Although the above model may be the ideal method for making decision choices, Lindblom asserted that it is not always feasible to follow. This is true for several reasons. First, rational-comprehensive decisionmaking is extremely difficult to achieve in reality because:

> ...it assumes intellectual capacities and sources of information that men simply do not possess, and it is even more absurd as an approach to policy when the time and money that can be allocated to [resolve] a problem is [sic] limited, as is always the case (Lindblom 1959:80).

Indeed, Simon asserts that:

> In actual organization practice, no one attempts to find an optimal solution for the whole problem. Instead, various particular decisions ... are made by specialized units ... In making these particular decisions, [they] do not solve the whole problem, but find a "satisfactory" solution ... (Simon 1964:16).

Incremental decisions are usually arrived at by setting a general objective. Then a comparison is made of the obvious and most feasible alternatives to reach that objective. There is heavy reliance on the record of past experience rather than on theory; incremental alterations of present policy are projected into the future, to judge the possible consequences of each. The most feasible means-end combination open to the decisionmakers is ultimately chosen. Typically, goals are only partially achieved; thus, one would expect to repeat the above sequence as conditions, preferences, and information changes or improves (Lindblom 1959). Incremental approaches to policymaking are also less likely to disturb the status-quo, and thus are very conservative. Further, small adjustments to existing policy are politically easier to achieve than are sweeping changes.

Instream flow decisionmaking is typically incremental in a number of ways. State laws and programs developed for the protection of instream values are themselves incremental efforts, within the wider body of water law, to resolve the conflict that exists over who uses what water, in what amounts, and for what purposes. Second, within organizations, decisions are also made incrementally, i.e., internal organizational choices regarding what policies to pursue and recommendations to make in a particular conflict are based in large part on that organization's past experience, and new decisions tend to differ only marginally from past policy stands. Finally, as organizations negotiate among themselves while trying to protect their respective interests,

the adjustments each organization has to make to accomodate the other participants tend to be achieved in an incremental manner.

In the Cedar River case, for example, the Washington law that allowed a State agency to apply for minimum stream flows, and then authorized the Washington Department of Ecology to promulgate an appropriate flow regime, can be seen as an incremental effort on the part of the State legislature to adjust Washington water law so that instream values could be protected. This statute, then, is incremental in the first sense. Secondly, the way in which the State Department of Fisheries developed its flow recommendations, based on past experience and field studies, on the one hand, and then adjusted that recommendation as it consulted with other agencies, on the other, can also be seen as incremental. Finally, the annual summer negotiation sessions among the parties in the Cedar River case are incremental. Each organization comes to the negotiation with its position only slightly altered from the last encounter, and each organization then adjusts its position incrementally as bargaining and compromise ensues.

The way in which organizations tend to bargain and compromise in this latter sense, however, is also influenced by the general context of the instream flow issue; this relates to the second major theoretical thrust of LIAM, which is explained in the following paragraphs.

3.2 DECISION ARENA

A "decision arena" can be thought of as a bounded area in which action of one type or another occurs. According to Lowi (1972), most policy decisions are typically made in one of four major arenas: (1) distributive, (2) regulatory, (3) redistributive, or (4) constituent. The first two, distributive and regulatory, are the primary arenas in which instream flow decisions are made. This is because the other two policy areas identified by Lowi have only an indirect bearing on instream flows. Redistributive policies concern such issues as taxation, and the Federal Reserve's credit controls, for example, while constituent policies are the result of direct actions by groups in society to shape the nature of politics itself, as in the case of reapportionment or the creation of a new government agency.

Distributive policies divide benefits and services throughout society and have tended to be in the form of such things as subsidies and construction grants, project authorizations, and sales of Federal lands. In this arena, the Government acts as a policy "broker," and groups compete with one another to obtain these benefits and services (Lowi 1972; Mann 1982a; Ripley and Franklin 1984). Mann (1982a) asserts that distributive politics at the National level has been one of the "hardiest flowers in the policy-making garden, withstanding the assaults of fiscal freezes, economic/analytical pruning, and the best of environmental pollution control." At the interorganizational level, it is a highly political arena in which politicians base their ultimate decisions regarding who gets what upon such factors as perceptions of current power relationships among the groups, public support for one proposal over another, or favors owed by the political entity to the groups involved (Lowi 1972; Doerksen and Lamb 1979; Lamb and Lovrich 1986).

This process emphasizes bargaining strategies and negotiation as a way to "cut a deal" among the parties so that, at least in the long run, each relevant and "legitimate" organizational actor obtains something it desired. The legitimacy of a participant is determined primarily by law and custom. Coalitions among organizations are formed to influence the outcome, but these interests may have little in common except for the support of a particular distributive action. With regard to instream flows, for example, this type activity occurs in lobbying efforts by various groups to, first of all, build a reservoir to hold water for release in dry periods, and then to influence the way in which that water is ultimately distributed (Lowi 1972; Doerksen and Lamb 1979; Lamb and Lovrich 1986).

In the regulatory arena however, the decision procedure is quite different. Typically, regulatory decisions are made in a quasi-judicial setting by a decisionmaker authorized to make the decision (Lowi 1972; Ripley and Franklin 1984), referred to here as the arbitrator. The type of arbitrator authorized to make the decision is determined by the laws and issues involved, as well as by the types of groups participating. The Federal Energy Regulatory Commission (FERC), for example, often serves this function in hydroelectric licensing applications. The objective of an arbitrator is to choose from among the proposed alternatives the best solution to the problem at hand. In the regulatory arena also, groups coalesce and compete to have their interests incorporated into the policy process, and they tend to do so on the basis of shared interests and mutual goals. Standards, in the form of policy decisions, result in both decisionmaking arenas, but the procedures and bases for making those decisions differ dramatically in each (Doerksen and Lamb 1979; Lamb and Lovrich 1986).

The assumption in this paper is that the various organizations involved in instream flow issues tend to have preferences for one arena over the other, depending on the organizational strengths and weaknesses of the organization. The dimension in which these preferences are expressed, however, is one of process rather than substance. These preferences result in specific behavioral patterns that lead to the development of organizational roles. These roles are reinforced by a phenomenon known as organizational process.

3.3 ORGANIZATIONAL PROCESS

Just as individuals tend to develop personal styles, so do organizations. This is true in part because each organization develops its own unique set of internal processes, upon which it eventually comes to depend. This is referred to as "organizational process." The essence of this view is that it postulates the existence of organizational routines and programs that shape internal decisionmaking processes (Cyert and Marsh 1963; Allison 1969, 1971; Mosher and Harr 1970; Sharkansky 1970). The idea is that since organizations have goals, which require planning and coordination, standard operating procedures (SOP's) develop within the organization to help it systematically achieve its goals. SOP's are typical methods for dealing with organizational goals and programs that an organization creates early on and that become entrenched over time (Allison 1969, 1971).

The end result is an organizational program that affects such things as personnel recruitment; the type and distribution of rewards and punishments within an organization; job tenure; and the internal decisionmaking apparatus of the organization itself. Those individuals and processes that do not fit organizational rules of thumb are weeded out, and the programs developed for goal attainment become even more entrenched. Programs are complex clusters of organizational routines arranged to deal efficiently with day-to-day problems. Thus, internal decisions tend to be based on the very selective collection, generation, and distribution of information relevant more to the organization's routine than to the issue itself. Each organization winds up with a set of relatively parochial priorities and perceptions. Flexibility, however, is the price paid for more certainty in decisions; organizational options are limited in both number and character, and trade-off possibilities are usually ignored. Many SOPs are not very useful, moreover, in new decision situations (Allison 1969, 1971).

The context of the problem affects the type of information to which decisionmakers are likely to be receptive (Ingram 1973). An organization tends to develop, through its organizational processes, a particular "fix" regarding the dimensions of the issues involved. Information is then selectively sorted out based on that conception, and information related to other perspectives or new ways of viewing the problem is not really considered. Indeed, Downs points out that decisionmakers tend to "... think in terms of traditional or habitual categories which are often unduly narrow in relation to their [real] needs," a bias that leads to the "one best way" approach to problems. Alternative approaches or solutions are thus frequently not even considered (Downs 1965). For example, water development projects, such as dams, levees, or irrigation works were seen for so long as a means to stimulate local economies that it was difficult to convince project developers of the need to examine the environmental implications of these projects. The "relevant" information included--and tended to be limited to--data on project feasibility, benefits and costs, and the strength and unity of local support (Ingram 1972). Environmental impact data, given this perception and context, were "irrelevant." Furthermore, once an organization becomes committed to an initial decision or approach, no matter how inappropriate it may be the organization will actually reject information that suggests alternatives (Rosenthal and Weiss 1966).

Thus, because of unflagging dependence on SOP's to define the range of "acceptable" behavior and "relevant" information, an organization tends to collect and evaluate the same type of data regardless of its ultimate utility in persuading the other decision participants. SOP's provide stability in organizations to be sure, and stand as decision rules that individuals and organizations alike can rely on from one problem to the next, lending continuity and certainty to the overall process (Mosher and Harr 1970). Many internal organizational decisions are thus predictable. Knowledge of the ways in which organizations typically make internal decisions--such as flow recommendations--and the ways in which organizations tend to pursue goals, provides a basis for making preliminary predictions about interactions and outcome.

Organizational routines are difficult to change (Mosher and Harr 1970). There are instances, however, in which organizations deviate from established routines, and become more innovative and accepting of atypical perspectives and solutions. Sharkansky (1970) suggests that these instances are brought about over time by a number of factors, including National traumas, decisions taken at one level of government that affect another level, and changes in the level of economic resources available. Such happenings can lead to a situation becoming ripe for change. Indeed, all of these factors can be seen as having had some causal impact on the changes that have occurred in the last decade in the recognition of instream values and the development of a variety of mechanisms for their positive inclusion in water policy decisions. Typically, change is difficult to achieve, however. LIAM assumes that an organization's internal decisions are shaped by organizational processes. These, in turn, are reinforced by the group "cultures" that tend to develop within organizations, which also reinforce organizational roles (Simon 1964; Schlesinger 1968; Janis 1972; Janis and Mann 1979; White 1986).

3.4 GROUP PSYCHOLOGY

"Group psychologies" tend to develop within organizations, especially in subunits, along with organizational processes. Janis (1972) refers to this as "groupthink." Groupthink is a "mode of thinking that people engage in when they are deeply involved in a cohesive group" (Janis 1972:9), and which evolves into an espirit de corps--or a "we" feeling of solidarity--among group members. Group solidarity is reinforced by a number of factors, including group norms or rules of the game, a group vocabulary, and a group perspective or view of the world. Often, these phenomena are reinforced by such things as "... honest conviction, bias, recruitment, limited information and the structure of power ... [and] these mutually reinforcing tendencies provide for the preservation of their own kind ..." (Schlesinger 1968:284). Subtle constraints exist, moreover, which strengthen group consensus. New members are socialized into acceptance and support of group norms. Deviant members are punished, either by exclusion from intra-group belonging or expulsion from the group altogether (Janis 1972; Mumme and Ingram 1984).

A number of studies have provided evidence for the existence of groupthink within many types of groups and organizations. Fenno (1970), for example, discovered four major norms operant in the House Appropriations Committee. Newcomers were found to undergo an "initiation rite" in which they learned to adhere to these norms. Kornberg (1970) examined the degree to which formal and informal rules and sanctions are utilized to reinforce group norms in the Canadian legislature. Mumme and Ingram (1984) studied the Papago Indian tribes in southern Arizona, and found a very anti-individualistic group culture that emphasized such values as cooperation, communality, and social harmony. For this group, consensus is highly valued in political decisions, especially with regard to the management of water resources.

Beckett and Lamb (1976) identified another factor that increases group cohesiveness, at least within organizations involved in the resolution of instream flow issues: professional alliance. Professional alliance refers to the high degree of understanding and cooperation that develops among

individuals of the same profession--others have also found evidence of this phenomenon in other professions and among professionals in general (Goleman 1954; Lipset and Schwartz 1966; Twight and Catton 1975; Alston 1983). It seems that similarity in education and professional background among group members in an organization decreases antagonism and leads to more interaction, not only within organizations, but among them.

Groupthink, however, often contributes to organizational inability to solve problems. Janis (1972) identified six tendencies that result from groupthink within organizations.

1. Discussions are limited to a few alternative courses of action, without a survey of the full range of options.

2. The group fails to reexamine later the initial preferences expressed by the majority of members, from the standpoint of nonobvious risks and drawbacks that had not been considered originally.

3. Group members neglect courses of action initially evaluated as unsatisfactory and spend little or no time discussing whether there are ways, for example, to reduce the seemingly prohibitive costs that had made the alternatives seem undesirable to begin with.

4. Group members make little or no attempt to obtain information from experts who can supply sound estimates of losses and gains to be expected from alternative courses of action.

5. Selective bias is shown in the way the group reacts to factual information and relevant judgements from experts, the media and outside critics, and instead the group shows interest in facts or opinions that support their initially preferred policies.

6. Groups spend little time deliberating about how the chosen policy or course of action might be hindered by bureaucratic inertia or sabotaged by political opponents.

Indeed, a dominant characteristic of groups is that members tend to remain loyal to the organization by sticking to the norms and decisions to which the organization has committed itself, even when the policy is working badly or has unintended consequences that are disturbing (Janis 1972; Janis and Mann 1979; Cialdini 1984; Goleman 1985).

The tendency of individuals and groups to stick to decisions and/or attitudinal commitments is well documented (Festinger 1957, 1964; Cohen et al. 1963; Ingram 1973; Cialdini 1984; Goleman 1985). As with organizational process, all aspects of group psychology are not negative. An organization with properly defined internal roles, with traditions and routines to which it consistently adheres, may well make good decisions. The key difference, though, is that these norms and SOP's must facilitate critical thinking and not block it. Further, organizational culture, and the values and loyalties that are a part of that culture, serve to "knit together the institutional fabric" of an organization, and represent the intangibles that make for

organizational pride and morale. Without them, organizational functions could not be decentralized and delegated with any confidence in consistency. Organizational behavior is thus highly predictable, particularly in response to new values that pose a potential threat to organizational goals, power, or survival (Seidman 1970). Using the context of "roles" developed within LIAM, organizational behavior patterns peculiar to instream flow issues thus can be identified, and predictions made about both the interactions that occur among the organizations and organizational influence on outcome.

3.5 BUREAUCRATIC POLITICS

Most natural resource decisions are the result of conflict, competition, and compromise between officials and organizations with diverse interests and unequal abilities to influence the outcome. Variously labeled "partisan mutual adjustment" (Lindblom 1965) and "bureaucratic politics" (Allison 1969, 1971; Allison and Halperin 1971), in this process, adversary bargaining is the rule (Ingram 1972, 1984).

Whenever a decision is the result of compromise, the chosen alternative will tend to benefit many goals somewhat, but maximize none totally. The way to understand a decision, in this view, is to discover the elements that are involved in the bargaining that precedes it; or if the desire is to maximize the amount of influence one has, the objective is to be able to predict the ways in which intergroup bargaining will occur. If bargaining power is concentrated in one group or set of groups, for example, the decision that emerges will reflect those organizations' separate and mutual goals to a higher degree than those of other organizations involved. The more influential organizations, in short, have a proportionately greater impact on policy outcomes (Doerksen and Lamb 1979; Lamb and Lovrich 1986).

In a study by Beckett and Lamb (1976), evidence was found for the operation of this process in instream flow decisions. These authors observed the prevalence of bargaining among organizations as a means to achieve policy. The art of instream flow politics, then, is the ability to get things done in such a context--and to predict the moves of the other players. In the process of mutual adjustment that usually occurs, the outcome is heavily dependent on the relative abilities of participants to operate effectively and influence the outcome. This involves power.

3.6 POWER

Power has long been a topic of interest to those researching administrative behavior and influence (Long 1949; Dahl and Lindblom 1953; Simon 1957b; Wildavsky 1979). According to Bachrach and Lawler (1981), power is the "essence of bargaining" and the key to understanding policy decisions made in a climate of mutual accommodation.

Some researchers have examined power as a function of hierarchical bargaining ability, i.e., as a function of the position of an organization in the institutional hierarchy in which it is located (Dahl and Lindblom 1953;

Simon 1957b; Seidman 1970); the actual resources an organization has at its disposal (such as personnel and money) (Fenno 1966; Lamb and Doerksen 1978; Rourke 1976; Clarke and McCool 1985); and the expertise the organization has or the information it can control in given policy areas (Benveniste 1977; Rourke 1976; Clarke and McCool 1985). In this latter regard, the power to control the flow and type of information that reaches decisionmakers leads to the ability to define the range of feasible or acceptable alternatives, and thus can have a direct and substantial impact on ultimate policy choices. Power has also been examined from a political perspective; power, in this view, derives (at least in part) from the extra-organizational support (e.g., public, political, constituency, clientele) an organization is able to build for itself and the goals it represents (Rourke 1976; Lamb and Doerksen 1978; Clarke and McCool 1985).

Power, moreover, is dynamic and fluid rather than static; it consists not only of the actual resources an organization has at its disposal to pursue a particular outcome, but its willingness to use those resources in a given situation; the type of tactics it chooses; and the successes and failures it has accumulated in the past in similar issues (Bachrach and Lawler 1981). Keeping these facts in mind allows one to better predict the outcome from an analysis of the power relationships involved, and has within it elements of reputational or historical power that can be converted into influence. The power to persuade is the key ingredient to influencing policy outcomes (Lamb and Doerksen 1978; Neustadt 1980; Bachrach and Lawler 1981). All of these notions of power have been incorporated into LIAM.

3.7 SUMMARY

The four assumptions that underlie LIAM have been examined and explained; the first three of these contribute to the development of organizational roles, while the fourth specifies the way in which these roles are assumed to be played out in instream flow decisionmaking issues. In brief, they are as follows:

1. At the organizational level, decisions are made incrementally; that is, internal organizational decisions are based in large part on past experience, and new choices differ only marginally from past policy stands;

2. At the organizational level, decisions are also shaped by organizational process--standard operating procedures that have developed over time and that determine the nature and functioning of the organization's internal decisionmaking structure;

3. Both incrementalism and organizational process are reinforced by the existence of organizational "psychologies"--intergroup solidarity and cohesiveness--which also helps explain the persistent reliance on incrementalism and organizational process;

4. At the system or intergroup level, decisionmaking between or among is characterized by competition, bargaining, and compromise; the

degree to which any one group has to adjust its position, moreover, is directly related to the power differentials involved, and the relative position of that organization vis-a-vis the others.

The first three facets of decisionmaking listed above (incrementalism, organizational process, and group psychology or culture) also represent the factors that lead to the development and persistence of the organizational roles outlined in this chapter. Within the general boundaries established by the laws, and the set of policies that develops under those laws, interested parties come together and determine the ultimate policy outcomes. This process is a highly competitive and interactive one, and the driving force that moves the issues toward resolution is power. Figure 1 summarizes the theoretical concepts outlined above, as they are assumed to operate in the model. The major idea here is that there are three factors that lead to the development and persistence of organizational roles in instream flow conflicts.

The first of these in Figure 1, incrementalism, refers to the fact that organizations decide what specific objectives to pursue in a given conflict based on similar experiences in past conflicts and from having interacted with the other organizations involved. Changes in past policies are pursued then, in an incremental fashion, with each alteration differing only marginally from past objectives.

The way in which organizations, once having decided on objectives, then go about pursuing those goals, is also based on past experience, and defined, in large part, by internal organizational processes that develop over time as the means to achieve specific ends. And, finally, the internal group "culture" that an organization develops over time, and into which it socializes new members, reinforces reliance and adherence to incremental decisionmaking, in general, and organization process, in particular. Group psychology comes, in short, to determine the "why" of an organization's goals and the ways in which it pursues those goals. All of these factors occur within organizations--and hence analysis of these facets is conducted at the group level of analysis.

These factors are postulated to exist and to lead to organizational roles--and organizational behavior associated with roles--apart from, although certainly connected to, any interactive behavior that occurs between the organizations involved in a resource conflict. Organizational role is the link between group and intergroup behavior and, as can be seen in Figure 1, is played out in two distinct dimensions. The first has to do with preference to operate in a particular type of decision arena, and includes brokers and arbitrators. The second is related to preferences for outcome, and includes advocates and guardians.

The ways in which organizations adjust their positions in the course of interaction and negotiation--the degree to which each is forced to compromise to obtain at least part of its original objective--is largely a function of the power that the organization brings with it to the conflict. As can be seen in Figure 1, power in instream flow issues derives from the resources, expertise, and outside support that an organization has at its disposal, as well as the degree to which it is willing to use these elements of power to

26

LIAM: THEORETICAL UNDERPINNINGS

Factors which build role   Incrementalism (What?)   Organizational Process (How?)   Group Psychology (Why?)

Role types   Process Preference Arbitrator Broker   Goal Preference Advocate Guardian

Decision arena

POWER

Partisan mutual adjustment or Bureaucratic Politics

Resources   Expertise   Support

Bargaining Behavior
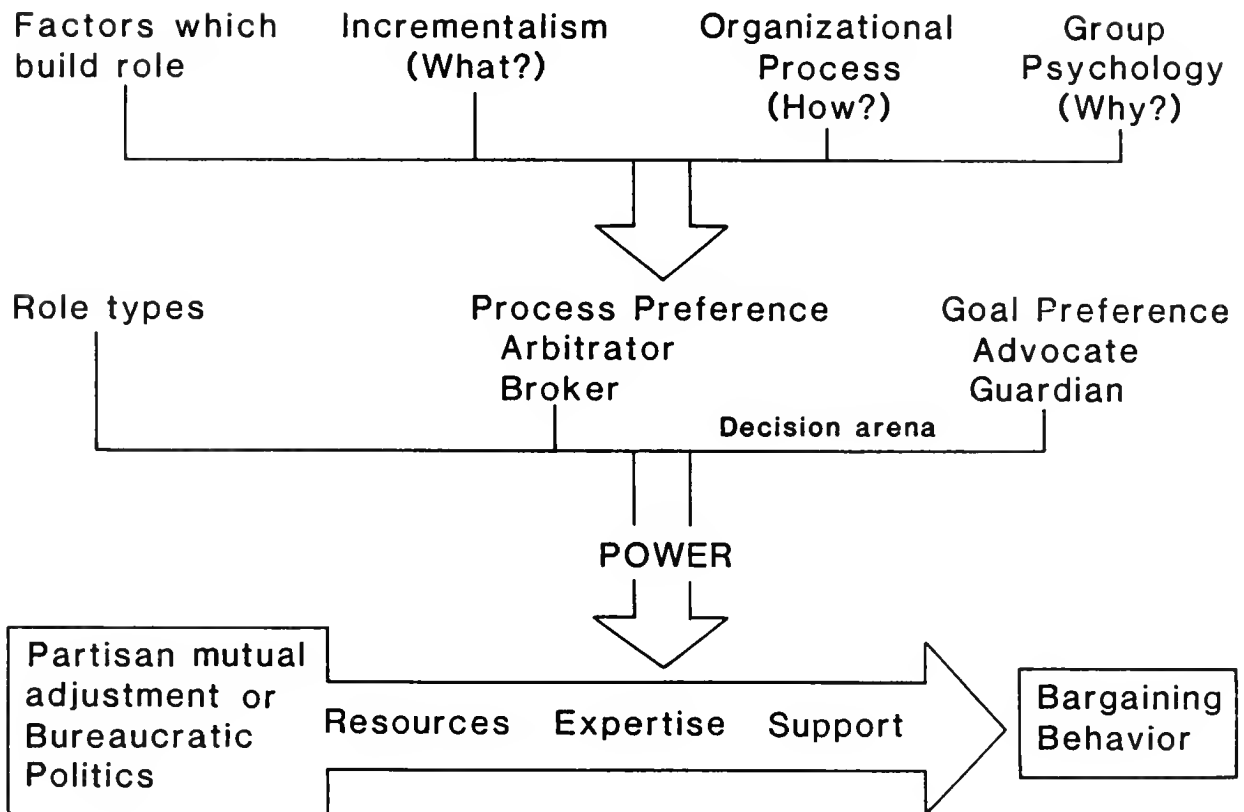
Figure 1. The theoretical concepts used to develop the Legal Institutional Analysis Model.

force an outcome that is favorable to its own position. Power and roles come together in a climate of bureaucratic politics, and lead to the bargaining behavior that is ultimately displayed by the organizations involved in an instream flow conflict. Analysis of these concepts as they affect instream flow issues occurs in four distinct phases. These phases are examined in the following chapter.

4. THE FOUR PHASES OF LIAM

The Legal Institutional Analysis Model (LIAM) provides a step-by-step process for understanding a particular instream flow issue and building effective strategies for participation in its resolution. This process is divided into four steps or phases, all of which operate on the assumption that individuals can accurately describe the factors that will influence the outcome of an instream flow conflict, and then determine the ways in which organizationa influence can best be brought to bear on the process. These phases include: (1) traditional surveys of the organizations and laws involved; (2) a description of organizational roles; (3) an analysis of the power relationships; and (4) an assessment and prediction of likely organizational behavior (Figure 2).

Phase I analysis is similar to the traditional assessment recommended and discussed in the literature, which has long been an important ingredient of policy analysis. In Phase I, an analyst attempts to answer the question: Who will participate in this conflict--and upon what statutory basis, if any?

4.1 PHASE I: SURVEY OF AUTHORITIES

Understanding the general context in which a decision will be made is necessary to properly scope a problem prior to participation in its resolution (Ingram et al. 1984). Many factors operate to define a resource issue. The steps in Phase I help the analyst to identify two of these factors and to organize them for further analysis. In the case of instream flows, as with other resource issues, understanding begins with the identification of the specific organizations and laws involved. The laws determine the number and types of organizations to be involved as well as set the general boundaries within which interaction among those organizations will occur. Thus, Phase I analyses are conducted in two separate steps: the organizational survey and the legal survey. In this manner, the analyst can identify the relevant organizational participants that need to be included in the overall analysis, and then determine the legal authority that each will bring into the decision process.

Organizational Survey

Relevant organizational participants need to be identified for three important reasons. First, the number and type of organizational actors must be considered preparatory to determining the role types involved. Second, the "mix" of organizations involved determines, in large part, the type of arena in which interaction will occur, which in turn shapes the nature of that interaction and gives the analyst some basis for preliminary predictions about

Phase I: Survey of Authorities

             List the organizational entities (i.e., agencies,
             interest groups, private organizations) that are
             involved; then describe the legal authorities (statutory
             and case law) that condition the actions of these
             organizations.

Phase II: Role Analysis

             Describe the roles expected to be played by each
             organization that is a party to the problem.

Phase III: Power Analysis

             Describe the elements that make up each organization's
             base of power, and evaluate the relative power of each
             entity that is party to the problem.

Phase IV: Behavior Analysis

             Based on knowledge of roles and power, predict the
             behavior (concerns, needs, and tactics) of each
             organization and prepare a plan of action.

             Figure 2. The four phases involved in
             conducting legal institutional analyses.

outcome. Recalling the previous discussion about the two decision arenas in which instream flow problems are typically resolved, if many organizations that prefer to operate in the distributive arena are involved, the likelihood exists that these organizations will take some sort of mutual or independent action to see to it that the issue is resolved in that arena, as opposed to the regulatory arena. Finally, identification of the organizations involved is necessary so that this information can be tied to the legal survey, which is the second step of Phase I.

Legal Survey

The laws involved in a particular instream flow decision represent the "decision foundation" of the past, onto which the new decision will be grafted, in an incremental sense. "Laws," in this context, refer not only to the specific State or Federal statutes that set the legal boundaries for a particular project or program, but also to administrative policies developed therefrom, administrative requirements for implementation, applicable judicial precedents, and the like. In instream flow and other resource issues, small decisions are grafted onto the foundation of existing policies, as adjustments are made for time, place, and context. At this level, incremental changes in past policies are made as groups come together and interactively determine each instream flow outcome. Typically, no attempt is made to recreate the basis upon which new flows are determined and promulgated. Instream flow protection programs are typically initiated in this manner at the State level. That is, a general statute is passed, often with vague or indefinite goals, which, in turn, sets the boundaries within which policies are ultimately developed to achieve those goals.

The point is that neither laws nor policies are made once and for all time; they are adjusted incrementally, and the sum total of these alterations represents the legal framework that is relevant for the resolution of an instream flow issue. By knowing the content of the legal foundation, and the changes that have been made in the past, one is in a better position to anticipate problems and to positively contribute to the process that shapes the outcome. Thus, in Phase I, after identification of the organizational participants has been completed, the analyst moves on to determine the relevant statutes (and the policies and rules developed from those laws), both State and Federal, that set the legal boundaries for resolution of the issue. And, finally, an effort is made to determine the type and degree of statutory authority that each organization has to participate in the negotiation.

The identification of the organizations and laws involved in a resource issue is an important step in understanding that issue and participating in its resolution; indeed, such an analysis is typically conducted (Ingram et al. 1984). In this sense, the steps in Phase I are "traditional" but important ones. Once such a "traditional survey" has been completed, the analyst is ready to move to the behavioral aspects of the analysis, dealing with roles.

4.2 PHASE II: ROLE ANALYSIS

Because of their planned nature and drive for calculable behavior and interaction, organizations are particularly amenable to analysis using the concept of role (Yarwood and Nimmo 1976). Roles can be thought of as guides for understanding, characterizing, and predicting organizational behavior (Lamb 1980). Organizations tend to play certain roles, moreover, with remarkable consistency (Golembiewski 1976).

The concept of roles has been used in explaining the budgetary process (Fenno 1970; Wildavsky 1974, 1975; Hrebrenar 1976). These works suggest that: (1) roles are strongly associated with expectations of behavior attached to an institutional position; (2) the various roles seem to fit in with one another to form a stable pattern of mutual expectations; (3) frequent contact increases understanding among the participants of the roles being played; and (4) the more homogeneous the membership of a group, the more consensus it is likely to have regarding its own organizational role (Wildavsky 1975; Hrebenar 1976). Hrebrenar (1976) found that (contrary to his expectations) the best predictor of budgetary decisionmaking behavior is past behavior patterns in similar types of decisions. LIAM incorporates a view of organizational roles that is consistent with these findings.

Because there are identifiable actors, issues, and activities that are peculiar to the establishment and maintenance of instream flows, and that occur within the boundaries set by statute, legal precedent, and tradition, decisionmaking here is characterized by heavy reliance on roles, and is shaped by the interactions that occur between organizations. These interactions, moreover, are themselves characterized by traditional patterns that have emerged over time and that condition the outcome (Beckett and Lamb 1976; Lamb 1980a; Olive 1981a,b; Lamb and Lovrich 1986). Thus, organizations enter a conflict with knowledge of their own position and the positions of others, particularly when they have interacted with these organizations in the past. Behavior thus tends to fall into standard and recognizable types, and the policy outcome often depends on how skillfully the collective actors can use this knowledge in dealing with other participants (Doerksen and Lamb 1979; Lamb and Lovrich 1986).

The role types that have been developed and included in LIAM are the result of three processes that occur within organizations and that have been documented in social science research. These processes were described under the theoretical section of this chapter and include: incrementalism, organizational process, and group psychology. First, organizations tend to make internal decisions based on past decisionmaking efforts, and rely heavily on the record of their own past experience to do so. Each organization, moreover, enters the bargaining process with its own position little altered from its past proposals or recommendations and, as negotiation progresses, these recommendations are again adjusted incrementally as a result of compromise. Incrementalism, then, can be viewed as shaping the "what" of organizational behavior. Second, the ways in which organizations pursue their organizational goals also tend to remain constant over time. Organizational processes, then, can be said to shape the "how" of organizational behavior. Third, the group psychology that develops within an organization also affects organizational

32

behavior and contributes to the development and persistence of organizational roles.

Four role types are postulated to characterize behavior in natural resource management issues: broker, arbitrator, advocate, and guardian (Beckett and Lamb 1976; Doerksen and Lamb 1979; Lamb and Lovrich 1986). These are represented as opposite extremes of two different behavioral dimensions. That is, organizational behavior is predicted to occur in two distinct dimensions, each of which results from a set of organizational preferences. The first dimension concerns the procedural preferences that shape organizational behavior, and stems from the preferences that organizations have for the arena in which an issue is to be decided. Thus, organizational behavior in this dimension can be viewed as occurring along a continuum, with two opposite role types located at each end. The two roles associated with this preference are labeled in LIAM as "broker" and "arbitrator" (Figure 3).

Broker Role Type

Generally speaking, a broker is an organization that combines two characteristics. First, it has some sort of physical control over natural resource systems, allowing it to physically control the allocation of water; and second, it possesses a highly political nature. A broker prefers solutions that spread the benefits to be derived from a decision around so as to satisfy as many interests as possible, or in a way that maintains its own power base. An extreme broker prefers to make the decision itself by compromise, bargaining, and coalition building. Less extreme players located along this continuum may not actually broker the decision, but prefer a bargained solution nonetheless. A broker is thus in a position to support either environmental or developmental interests. It is heavily influenced by political facts or expressions of support from higher authorities and cost-benefit information that demonstrates how the benefits to be derived from a proposed course of action can be divided among the parties. Brokers tend to push for negotiated solutions as a means to achieve results and to satisfy as many of the players as possible. Consensus is preferred. Examples of organizations of this type include the offices of State governors, State legislatures, some planning divisions within the U.S. Army Corps of Engineers, many politically created citizens boards and some State water allocation agencies (Beckett and Lamb 1976; Doerksen and Lamb 1979; Lamb 1980a; Lamb and Lovrich 1986).

Of course, not all organizations that prefer the brokered or distributive decisionmaking arena are brokers themselves, but may be closely tied to broker organizations or just prefer "brokered" decisions. For example, the group may have had a long-term and mutually beneficial relationship with the broker in charge of a particular decision outcome. Or the group may simply prefer a brokered decision in one instance because of political favors owed to it by other players or because of the type of power that it has. Organizations do prefer a certain type of procedure for decisionmaking, however, even if the organization is unable to make the decision itself.

Distributive Politics
BROKER

State Legislature ●

Arena

Water
Conservancy ●
District

Department of Game ●

Decision

FERC ●

ARBITRATOR
Regulatory Politics
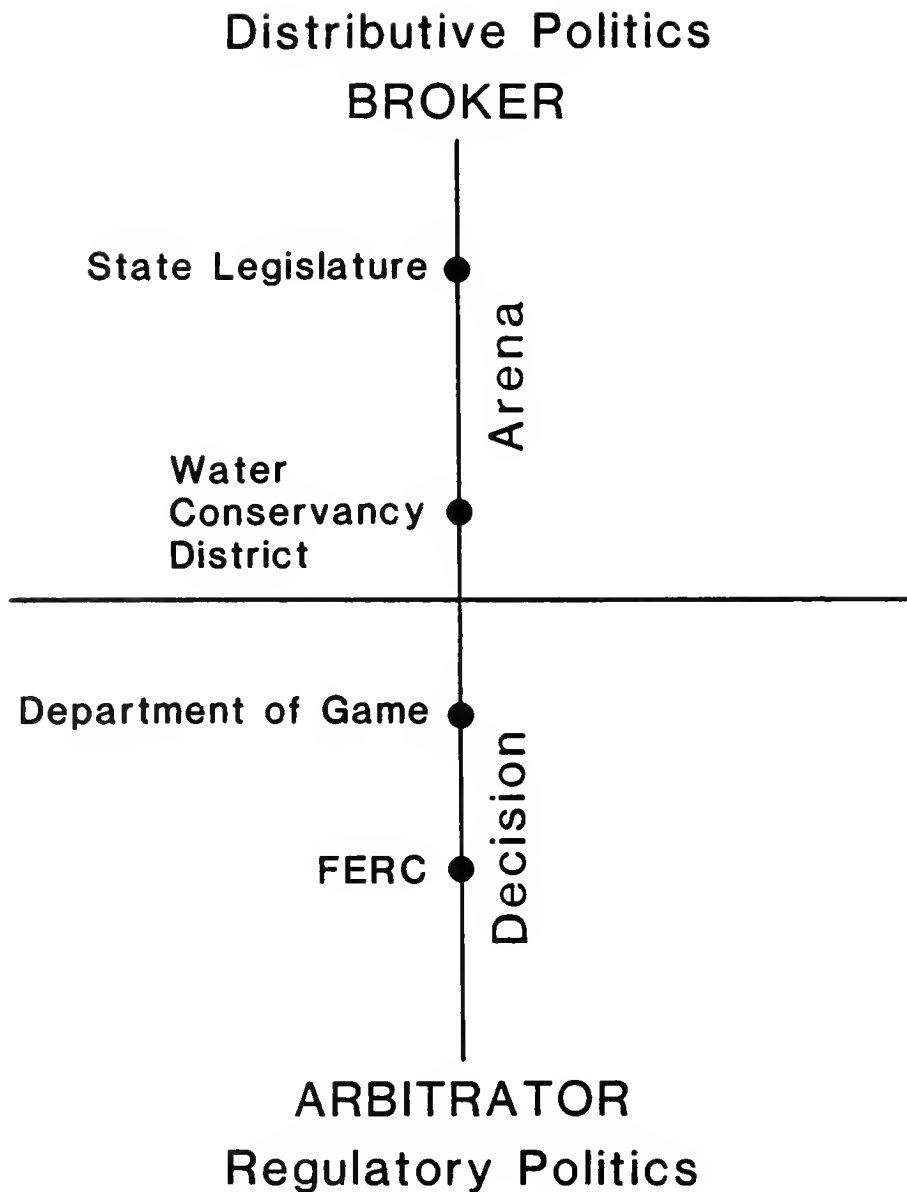
Figure 3. The location of four organizations
along the Broker-Arbitrator continuum.

Arbitrator Role Type

Arbitrators prefer an entirely different type of decisionmaking process. An arbitrator usually has statutory authority to promulgate flow regimes or the ability to legally control the allocation of water. Thus, it generally presides over a judicial or quasi-judicial process and determines the ultimate policy outcome itself, based on the adversarial presentation of technical or scientific information. This information is presented by the opposing sides of a conflict to persuade the arbitrator to accept their respective positions. Arbitrators tend to solicit such information from all sides of a conflict, in an effort to reach an "objective" decision. Examples of organizations of this type include: State and Federal courts, the Federal Energy Regulatory Commission (FERC), some State engineers, and some permitting elements of the Environmental Protection Agency (Beckett and Lamb 1976; Doerksen and Lamb 1979; Lamb 1980a; Lamb and Lovrich 1986).

As was the case with brokers, not all organizations actually "arbitrate" an outcome. But some organizations tend to prefer this process over the other, and organizational behavior results from this preference. Figure 3 illustrates how these preferences might be characterized in an instream flow conflict when preference for decision arena alone is considered. As can be seen, four organizations are arrayed along the Broker-Arbitrator continuum. Both a State legislature and a water conservancy district are located in the upper half of the diagram; however, the State legislature is farther out on the continuum, indicating a more extreme preference for a brokered decision, perhaps because the State legislature in this instance is the decisionmaker. The water conservancy district also prefers a brokered result, although to a less extreme degree. Once again, perhaps this is because of its political ties to the State legislature or its ability to influence election outcomes within that body. In the lower half of the diagram, the Federal Energy Regulatory Commission lies at the more extreme end of the continuum. Being a classic arbitrator, FERC strongly prefers to have the decision made within its own domain. A State department of game, however, is rarely in a position to actually arbitrate a decision. Yet, because of its data-collection routines, it prefers to operate in a situation where an arbitrator, such as FERC, is in charge, and where it is likely to have the most influence.

The second behavioral dimension is also one of preference, but, in this case, the preference is for the actual outcome, and thus is closely related to an organization's traditional values or mission. The two roles associated with this dimension, "advocate" and "guardian," are located at opposite ends of the horizontal axis in Figure 4 (Beckett and Lamb 1976; Doerksen and Lamb 1979; Lamb 1980a; Lamb and Lovrich 1986). The same element of degree comes into play along this continuum, i.e., the farther out on the continuum an organization is located, the more extreme is the indicated role.

Advocate Role Type

An advocate is an intensely ideological, prochange, and usually environmentalist organization. It actively seeks to alter the traditional (typically prodevelopment) ways in which National resources have been used and managed. It may be prepared to operate and exert influence in either the distributive

Distributive Politics
BROKER

Arena

ADVOCATE ——————————————————————— GUARDIAN

Goal　　　　　　　Preference

Decision

ARBITRATOR
Regulatory Politics
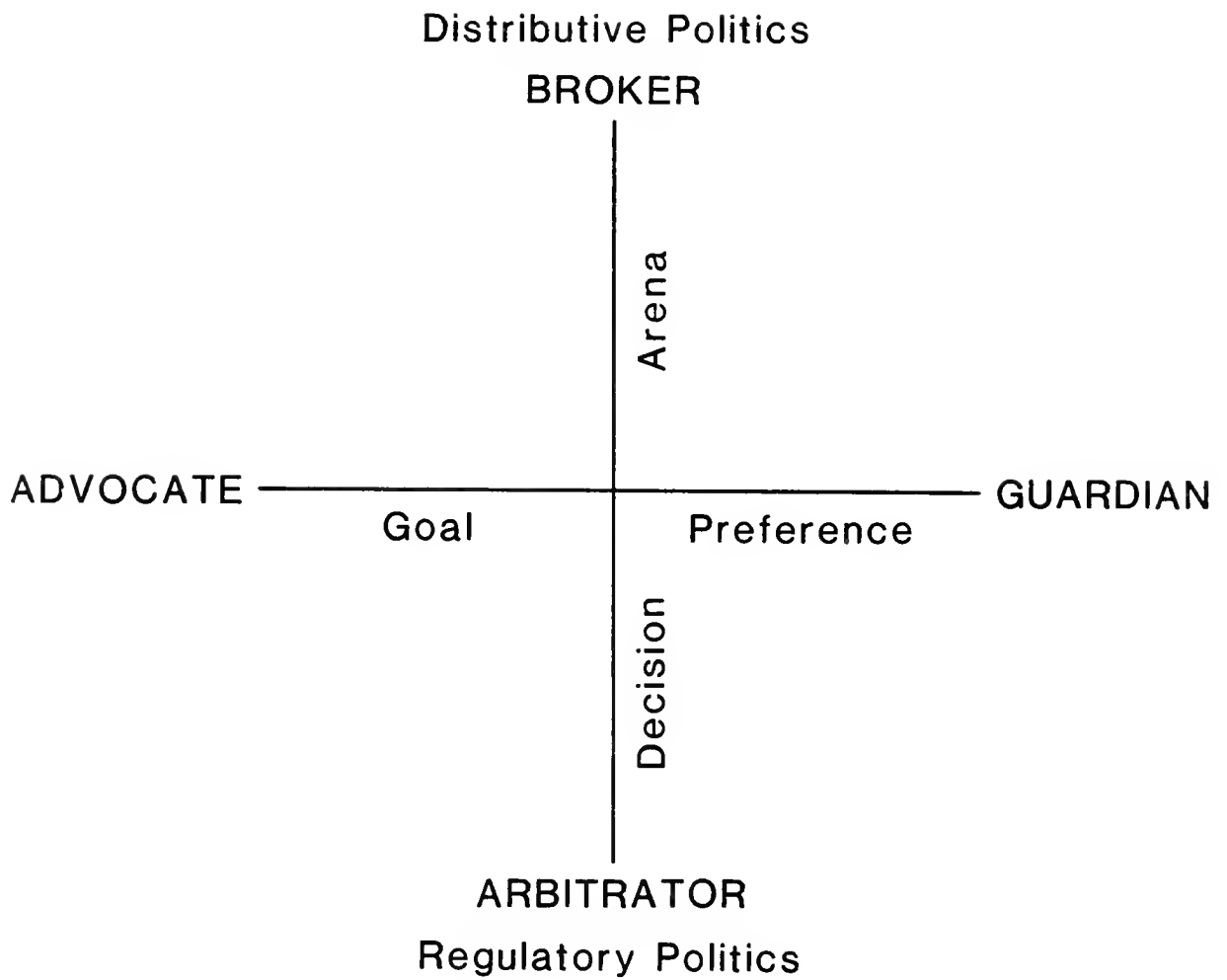
Figure 4.　An LIAM role map.

or regulatory arena, but will urge that resources be conserved or protected and that projects and developers be strictly regulated. An advocate is typically quite vocal on behalf of the values it represents and is unwilling to compromise. Usually without statutory authority to prevent by caveat what it views as environmentally harmful projects, it instead reacts to proposals and projects initiated by others. It tends to be well prepared to demonstrate the "correctness" of its viewpoint through its well-developed data gathering and analytical capabilities. It will not hesitate, however, to back up scientific or technical facts with crusading campaigns initiated on behalf of its values. Thus, it attempts to cultivate media and public opinion on behalf of the environment, and typically is associated with environmental "associations" or "clubs." Examples of advocate organizations include the Division of Ecological Services within the U.S. Fish and Wildlife Service, State fish and game departments, the National Marine Fisheries Service (NMFS), and environmental interest groups, as well as some consumer and health and safety organizations (Beckett and Lamb 1976; Doerksen and Lamb 1979; Lamb 1980a; Lamb and Lovrich 1986).

Guardian Role Type

At the other end of the goal continuum, guardians attempt to protect the productivity or market utility of resources. They safeguard the traditional ways in which natural resources have been used and managed. A guardian will therefore resist attempts at change that might be urged by advocates or others. Since it is usually possessed of established and influential constituencies, whose interests it must protect, a guardian prefers political strategies to persuade others of the correctness of its view. These political strategies are usually "traditional" logrolling and influence-based processes. Like the advocate, the guardian is also extremely ideological, but in this case, ideology centers around such values as "economic progress" and "developmental benefits." Examples of organizations of this type include the U.S. Bureau of Reclamation; U.S. Forest Service; water conservancy districts; special districts, cities, and counties; the Division of Refuges within the U.S. Fish and Wildlife Service; State departments of parks and recreation; bankers; and various land interests (Beckett and Lamb 1976; Doerksen and Lamb 1979; Lamb 1980a; Lamb and Lovrich 1986).

Role Patterns

In any instream flow conflict, a variety of organizations become involved; each of these organizations brings with it preferences, both for the outcome and for the arena in which that outcome is to be generated. An organization's preference for outcome is linked to its goals or mission, whereas the procedural preference is related to the resources it has at its disposal to influence the outcome.

Not every organization holds these preferences to the same degree or in the same order, however. For example, a State department of fish and game may, in any given conflict, prefer to have the decision arbitrated, but it will also prefer a certain type of outcome, presumably one which protects a threatened fishery or establishes a flow regime that meets the ecological requirements of a particular ecosystem. Its behavior, though, will be

dominated by the stronger preference. If it turns out to be for a particular type of outcome, then the preference for an arbitrated solution will be secondary. An organization exhibits behavior associated with two role types simultaneously in each issue in which it is involved. The degree to which each role type is exhibited may vary from issue to issue; however, one role typically dominates.

Advocates and guardians also tend to design their behavior to accomodate the presence of an arbitrator or broker, and will attempt to push the decision toward resolution in whichever arena they feel will support their values (Olive 1981a,b, 1982). Different strategies are pursued by these organizational types, depending on the issue. Advocate organizations, for example, often develop data gathering and analytical capacities, which are most influential in the regulatory arena, and are often highly familiar with procedures used by arbitrators to make decisions. Arbitrators tend to rely on them for information and the opportunity to act. Guardians are more familiar and comfortable with political strategies and often seek to use their constituencies to show injury from an advocate's initiatives.

LIAM allows the analyst to discern the dominant role type expected for each organization, as well as its secondary role type, and the degree to which organizations can be expected to exhibit both types of behavior. Each organization is evaluated in terms of all four role types; expected behavior is calculated within each dimension; and the role type that appears to most accurately describe an organization's behavior is the dominant role. Each organization is located in a particular behaviorial space that is defined by its location in both dimensions at once.

Figure 5 illustrates the relative positions of two hypothetical organizations. The circular line within a quadrant represents the midpoint in that quadrant. Organizations located within the circle, closer to the point of origin, are moderate role players, whereas those outside it are more extreme. The diagonal dotted lines divide each quadrant in half, so that an analyst can determine the dominant role type for an organization. In this example, the State legislature is located in the upper right-hand quadrant on the left-hand side of the dotted line in that quadrant, closest to the broker continuum. Its dominant role type is that of broker. Thus, this particular State legislature is predicted to strongly prefer the decision to be a brokered one, and its behavior in this regard will be extreme. It will actively seek to pull the issue into this arena. At the same time, though, it will tend to lean toward the type of outcome usually promoted by guardians. If it has the opportunity to broker the decision itself--as is probable--it is likely to be highly receptive to information supporting guardian values. The FWS-ES is located in the lower left-hand quadrant, beyond the circle; thus, its behavior as an advocate will be extreme. It prefers an arbitrated solution, though not to an extreme degree.

Each of the 16 subquadrants (A - P) in Figure 6 has associated with it different types and degrees of role playing. These 16 behavior patterns are described in Appendix I. By examining the number, types, and relative positions of all the players in a given conflict, an organization preparing for involvement in an instream flow conflict can develop strategies that will
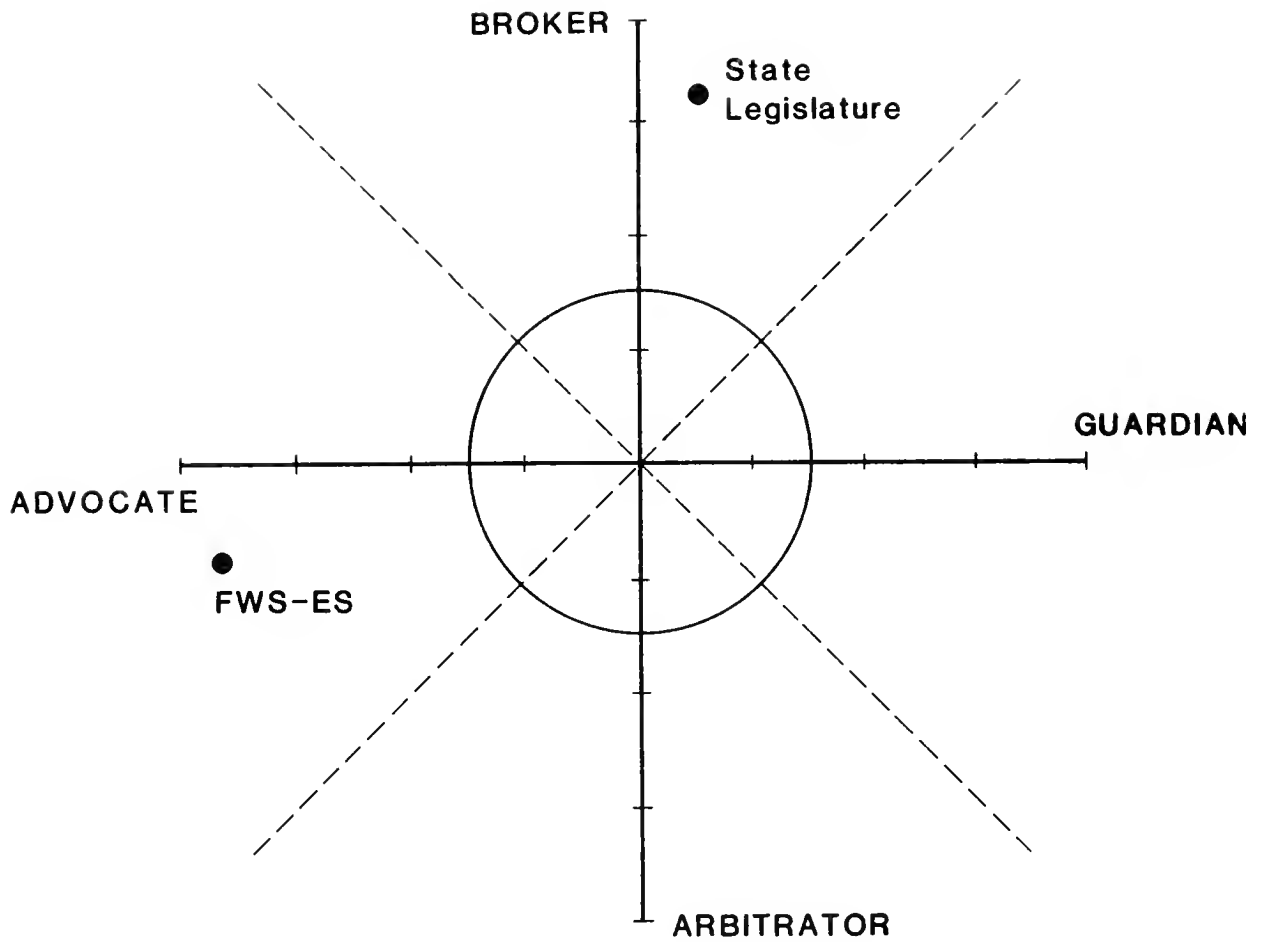
Figure 5. The location of two typical organizations on an LIAM role map.
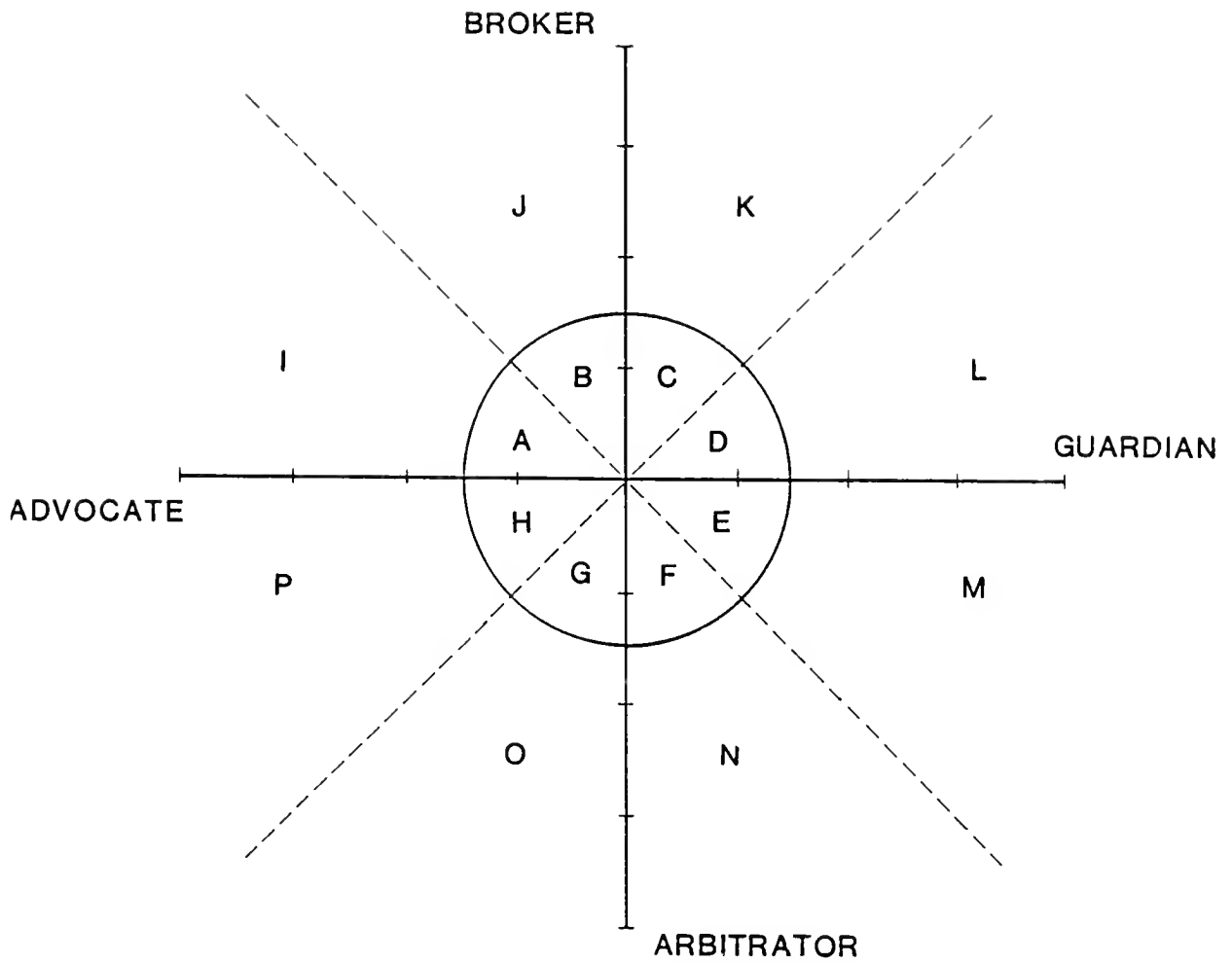
Figure 6. The sixteen subquadrants (A - P) of an LIAM role map.

be most appropriate to the problem at hand. These strategies, moreover, will necessarily be of a bargaining nature, since natural resources issues are resolved in a climate of bargaining (Ingram 1972).

4.3 PHASE III: POWER ANALYSIS

In any instream flow problem, there are inevitable and conflicting preferences among actors with unequal levels of power and influence. Each organization, in the process of interacting with other participants in a bargaining situation, modifies its original objectives to achieve a mutually acceptable decision that at least partially benefits its original goal. Neither side, as was the case with the Cedar River problem, typically has enough support to achieve its goals totally or by simple caveat.

Organizational power in instream flow issues is postulated to exist in three major categories: resources, expertise, and support. In the first category, Lamb and Doerksen have identified a number of important sources of power, all of which relate to the actual resources an organization has to expend in the resolution of a conflict at any given point in time. These include: statutory authority; the ability to physically control stream flow; designation as the implementing agency; legal ownership or management of the land or water in question; political support; public support; money; personnel; and the frequency and intensity of past involvement in such issues (Lamb and Doerksen 1978). These last two elements of power--frequency and intensity of past involvement--are indicative of the degree to which an organization is willing to commit itself to use its resources on behalf of a particular outcome; commitment is thus an important ingredient of power (Lamb and Doerksen 1978; Bachrach and Lawler 1981).

The second category of organizational power has to do with differentials in organizational expertise. The resolution of instream flow issues tends to be highly dependent on the availability of technical and scientific information; the nature of organizational expertise in relation to the technical issues involved, then, is also a crucial component of organizational power (Lamb and Doerksen 1978; Rourke 1976; Clark and McCool 1985). Methodological sophistication for data acquisition and analysis, for example, directly affects an organization's ability to support its recommendations (Lamb and Doerksen 1978). Important considerations in this regard include: What type of information is an organization involved in collecting and disseminating--and to what degree? What organizational routines are currently in place that facilitate the flow of information? Does the organization typically produce information that is easily understood by the other participants--both in terms of methodologies and results? Is an organization dependent on other groups for the information it needs--or is it in the business of supplying such information to others? What is the reputational quality of an organizations's expertise? Does it tend to generate a high level of respect in its field? The answers to these questions enable an analyst to better predict the tactics that will be chosen by the groups involved to pursue a particular outcome, as well as the nature of the outcome itself (Rourke 1976; Bachrach and Lawler 1981).

The last category of factors that influence organizational power in the instream flow context has to do with the degree and type of clientele or interest group support an organization has, either in terms of its general goals or with regard to one specific issue or set of issues (Lamb and Doerksen 1978; Rourke 1976; Clarke and McCool 1985). Relevant considerations here include: How many groups are willing and able to offer support--and to what degree? How cohesive or organized are these groups? How aware are they of the issues involved? How much does the general public tend to support the kinds of goals represented by these groups? And, finally, how politically astute do they tend to be?

The potential power inherent in these factors determines the type and nature of strategies that will be chosen by the organizations involved, and sets the stage for the intergroup bargaining that will occur. The tactical choices made by the various participants, however, can in turn alter the power relationships and lead to the selection of other tactics. That is, the interplay between potential bargaining power and tactical action can transform the bargaining outcome, as the groups compete, coalesce, and mutually adjust their various positions (Bachrach and Lawler 1981). Because of the give and take nature of this process, bargaining outcomes on one issue can affect a party's power with regard to another issue--and the overall settlement at one point in time can affect future bargaining outcomes. The process of mutual adjustment, then, has an extremely fluid quality (Rourke 1976; Bachrach and Lawler 1981).

4.4 PHASE IV: BEHAVIOR ANALYSES

As indicated in Figure 7, it is in this final phase (Phase IV) that the information gathered in the previous steps is combined and analyzed. It is here that the analyst examines the information as a whole, and attempts to answer the question: What does all of this mean? Rather than looking simply at the authority, role type, and power associated with each individual organization, the analyst looks at the combination of statutory authorities, role types, and power involved.

There are three general types of questions that must be answered in this part of the analysis. The first of these has to do with the arena in which the decision is likely to be made. In this regard, the analyst surveys the organizations that have been previously identified and examined in the first three phases of the analysis and attempts to determine how many of these will prefer an arbitrated outcome rather than a brokered outcome--or vice versa. It is important to determine the degree of these preferences as well. For example, four organizations may exhibit a preference for a brokered decision, and only two desire an arbitrated solution; these latter two organizations, however, may be more successful in pushing the conflict into the regulatory arena, if their desire to do so is extreme.

The converse, of course, may also be true. Moreover, those organizations strongly desiring a brokered solution, made in the distributive arena, are much more likely to exhibit behavior that attempts to force participants into that arena. The major considerations here are: (1) the statutory environment surrounding the conflict and (2) the authority each organization has to participate.

LIAM: THEORETICAL UNDERPINNINGS

PHASE I

| Factors which build role | Incrementalism (What?) | Organizational Process (How?) | Group Psychology (Why?) |

PHASE II

Role types

Process Preference
Arbitrator
Broker

Goal Preference
Advocate
Guardian

Decision arena

POWER

PHASE III

Partisan mutual adjustment or Bureaucratic Politics

Resources   Expertise   Support

PHASE IV

Bargaining Behavior
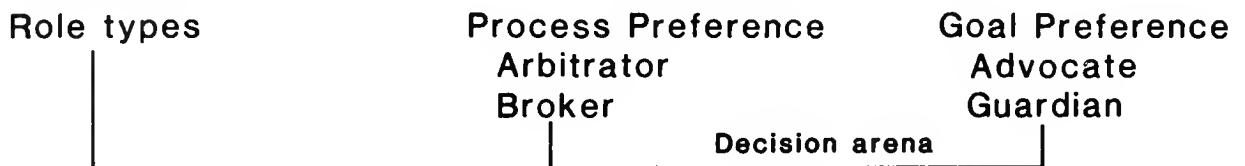
Figure 7. Flow chart of the theoretical concerns addressed in each of the four phases of LIAM.

Key questions for the organizations identified as preferring to operate in the distributive arena include: Is there any one organization among them with the legal authority or political clout to broker the decision itself? Do the organizations that prefer a brokered process have ties with one another or with the potential broker? Have they worked together frequently in the past-- or formed coalitions among themselves to influence the outcome? This information then must be compared to information regarding the regulatory arena. How many organizations prefer to operate in the regulatory arena? Is there one among them with the authority to arbitrate? Is litigation likely if the decision is not arbitrated? Based on the answers to these and similar questions, the analyst can develop strategies for participation in the conflict.

For example, if the distribution of organizations (in terms of procedural preferences) and the legal context of the issue is such that it is likely to be resolved in the distributive arena, through a process of negotiation and compromise, an analyst might be interested in looking at the political connections of his organization versus the others. Is there a potential political coalition that could be formed on behalf of a particular set of values or objectives? What are the best methods for communicating with the broker and other participants in such a political environment? What compromises can be made--and obtained? Which negotiating strategies will be most suitable in this environment? On the other hand, if it appears the solution will be arbitrated, what type of information will the arbitrator be interested in reviewing? What channels of communication are available? What procedural requirements are in place for participating in this arena? Are there filing deadlines? Which organizations are likely to present what types of information to the arbitrator?

A second set of questions has to do with the organizational values associated with the conflict. Each organization has a preference for a particular type of outcome, no matter what its preferences for arena, and the various organizations involved will pursue their preferred outcomes with varying degrees of intensity. It is important, then, to determine not only number of organizations preferring guardian-type outcomes over advocate ones, but the intensity of these preferences as well. For example, is protection of the particular resource involved a major mission of any of the organizations? If so, how many? What is the likelihood of two or more of these organizations forming a coalition on behalf of these resources? How actively will they pursue change? What type of change? Conversely, how many organizations are there that strongly desire to see this particular project or developmental initiative undertaken? What stakes are involved for these organizations? What types of information and tactics will the groups likely pursue, given the nature of their commitment and interest in the outcome? Is compromise likely? If so, by whom? What trade-offs might develop? Answering these questions puts an analyst in a better position to determine the most effective strategies to pursue on behalf of a particular set of values. If it appears, for example, that intensely committed guardians outnumber the advocates, and that the decision will likely be a brokered one, an advocate organization can choose from among alternative strategies those that are most likely to advance its own position and enhance its ability not only to communicate with the guardians involved, but to influence the outcome so that its own objectives are at least partially achieved.

A final set of questions, which need to be answered prior to developing these strategies, has to do with the types and distribution of power among the participants. It is here that the analyst attempts to answer the questions: Given the distribution of preferences for both process and outcome among the participants, and differing levels of intensity with which these preferences are likely to be pursued, how much power will these organizations have at their disposal to do so? What types of power will come into play? What relationships (especially in terms of power coalitions that are in agreement regarding preferences for process or outcome) are likely to develop among these organizations? If an organization, for example, is confronted with a powerful coalition that is intensely interested in the conflict (whatever the nature of that coalition), the strategies it chooses are very likely to be quite different than if no coalition existed. That is, if the organization expects to have any degree of successful participation at all.

The following chapter introduces the computerized model developed for gathering information about a conflict and the organizations involved.

5. LIAM: THE COMPUTER MODEL

Preparing for involvement in an instream flow issue is no easy task. At a minimum, it involves an examination of laws and institutions as well as development of strategies for pursuing organizational goals based on that information. Preparation of the scope and depth envisioned here may seem overwhelming. The computerized version of LIAM has been developed to provide a systematic, efficient, and theoretically sound method of analysis to simplify the task.

Conducting institutional analyses using the computerized version of LIAM begins with logging on to the computer terminal and creating a file to store information about the instream flow issue. The User's Manual contained in Appendix II gives complete instructions for using LIAM. There are three major computer programs in LIAM--Query, Looky, and Mapum--each of which is discussed briefly in the following paragraphs.

5.1 THE COMPUTER PROGRAMS

"Query" is an interactive program that runs the questionnaire that is the information-gathering element of LIAM. The questions contained in this program were developed based on the theoretical assumptions discussed in Chapter 3. The questions in Query are divided into three major sets, and each of these relates to one of the first three phases discussed in Chapter 4: survey of authority, role analysis, and power analysis.

Organizations tend to develop consistent behavioral patterns, and these behavioral patterns have been categorized in LIAM; 16 distinct role types that are associated with organizations typically involved in instream flow conflicts have been specified (see Appendix I). The questions in Query help the analyst identify role types for each of the organizations being analyzed. And, since most resource decisions are ultimately made through a bargaining process, the questionnaire also allows the analyst to examine the relative amount and types of power each organization has at its disposal and may be willing to bring into the bargaining process. By answering the questions contained in this program, the analyst can approximate the legal setting and key organizations in a particular dispute, as well as the legal authority assigned to those participating organizations, the behavior patterns associated with each, and the power relationships involved. The analyst then uses the other two programs of LIAM, Looky and Mapum, to examine and analyze the conflict.

5.2 PRELIMINARY STEPS BEFORE RUNNING QUERY

Prior to actually running Query, the analyst must take several preliminary steps. First, organizational participants to be included in the analyses must be identified. The goal is to identify all organizations, both private and public, that will actively and directly participate in the decisionmaking process. In selecting organizations for inclusion in the analysis, the analyst should consider those organizations that typically participate in similar issues (e.g., State and Federal agencies) as well as those having a direct stake in the outcome (e.g., project developers, resource consumers). In addition, organizations with a political stake in the issue should be included; that is, even though an organization may not have a direct interest in one specific outcome over another, it may have a real interest in seeing to it that the issue is decided in a particular manner, and will become involved as a result of that interest.

The idea is to identify and include all groups that will participate, interact, and have some sort of influence on the outcome. Comprehensiveness is desirable, since the overall analysis will be flawed if significant groups are omitted. This is because groups interact in a negotiation; that is, each group not only behaves in a certain fashion, but also responds to the behavior of other groups as the negotiations proceed. Omitting one significant group may lead an analyst to ignore an important set of stimuli to the intergroup interactions. The set of groups included in the analysis should be all-inclusive--but realistically so. If too many groups are included that do not interact or affect the ultimate outcome, the analytical effort may become too tedious, the information collected overwhelming, and the tactics developed therefrom vague and difficult to pursue.

Identifying organizational participants can be accomplished in a number of ways. First, a review of the laws surrounding an issue will generally indicate which organizations will enter the conflict, as well as the stage of the process at which they will do so, and in what capacity. Typically, the laws will also reveal which organizations must act--and which ones merely have the opportunity to act. Another way to accomplish this task is through the collective judgement of experts in the field. This technique has been success-fully utilized by other disciplines (Linestone and Turoff 1975; Zuboy 1981).

The most informal of the "professional committee" approaches is a round-table discussion; these discussions are typically facilitated by a moderator, and although consensus may be difficult to achieve, it is recommended. Scheele (1975) suggests that at least three types of individuals be represented on the committee. Although Scheele was referring to a situation in which diverse groups with differing goals are selected for the purpose of developing habitat suitability criteria, the same principles seem applicable here.

The first of these types of individuals are those directly involved in the conflict and who have a "stake" in the outcome. The stake may be of a professional or an ideological nature. For example, the supervisor in charge of an organization's technical or field studies may have a professional interest in seeing to it that the group's recommendations are accepted--or at least considered--while another person within the organization may have an

intense ideological interest in seeing to it that a particular objective is obtained. The second type of individual is the "expert." These are individuals (from within or outside the organization conducing the analysis) who specialize in the technical or legal aspects of the type of issue or who have had experience in the issue area. Experts, in Scheele's sense, are typically further removed from the operational aspects of the organization and can bring a measure of objectivity to the process. The third type of individual is the "facilitator." These are people who have keen organizational skills and who are good at moving the discussion forward in a smooth and timely manner. They are also able to clarify facts and synthesize information for the group.

In selecting a committee such as this, it is important to remember that the idea is to include diverse points of view. It is also important that the individuals chosen for membership on committees of this type are either interested enough to take the job seriously--or can be provided with enough incentive to do so (for example, monetary awards or certificates of appreciation for participating). Once the panel is selected, the moderator leads it through a series of brainstorming sessions in which: (1) criteria are generated for including organizations in the analysis; (2) all participants are encouraged to identify the organizations each feels are relevant; (3) a list of potential organizations is drawn up by the committee; and (4) the list is discussed and a final number is chosen by the members of the committee. All organizations obtaining an agreed-upon (e.g., 51% to 100% agreement) amount of consensus are included in the LIAM analysis.

A more formal approach, which does not have the disadvantages of committees, is the Delphi method. Delphi was first employed in military planning efforts, and has since been used in such diverse areas as health care, the environment, local planning, transportation, and fisheries management (Zuboy 1981). The most common Delphi exercise is in questionnaire format. In this case, a questionnaire is developed that details the specifics of the conflict and outlines criteria for selecting organizations. This form is then sent to a set of experts (or experienced individuals) who are asked to identify all of the organizations that meet those criteria. The results of the questionnaires are combined to produce two short lists. One of these includes all of the organizations identified by an agreed upon majority of the respondents as directly relevant to the issue, while the second includes all those upon which majority opinion could not be reached. The respondents then review this second list and identify those groups that they strongly feel should be included, along with reasons for doing so. The results of the second round are sent back to the respondents, and this process is repeated until the desired amount of consensus is achieved (Linstone and Turoff 1975; Zuboy 1981).

Once this has been accomplished, each organization identified should be analyzed by at least three different individuals. These can be individuals either internal or external to the organization conducting the analysis. Each of these individuals--referred to within LIAM as respondents--then answers the questions presented in Query in relation to that organization. It is crucial to have each organization analyzed by three different individuals to obtain an "averaged" set of responses. This is desirable for two reasons. First, individual perceptions of the same organization differ from one another, and while neither perception may be more "right" in an absolute sense than the

other, some method for reconciling the different perspectives must be incorpo-
rated into the analysis. Second, some people are naturally inclined to lean
in one direction or the other, in terms of degree, when responding to questions
of the type presented in Query. For example, a series of questions or
descriptive statements is presented, and the respondent is asked to indicate
the degree to which each statement can be applied to the organization he is
analyzing. The following question is typical of those presented in Query:

> This organization typically focuses on the need to
> preserve the natural environment in conflicts such as
> this:
>
> (A) Almost always
> (B)
> (C)
> (D)
> (E) Almost never

The respondent selects the response that he thinks most accurately describes
that organization. The middle responses are degrees of agreement that are
left to the respondent's imagination, since confusion may result if no response
choice absolutely "fits" the description of behavior the respondent has in
mind. Some individuals tend, however, to systematically select responses that
exaggerate the degree to which an organization exhibits the described behavior
or has the indicated attribute, while others tend to consistently under-
estimate. LIAM allows the analyst to combine the three sets of responses for
each of the questions for an organization. The individuals responses are
assigned numerical scores within LIAM and the computer produces an average
score for each question. The three response sets for each organization are
combined by the analyst (using Mapum) after all of the relevant organizations
have been identified and examined using Query.

Individuals should be chosen to analyze the organization(s) with which
they are most familiar. Care should be taken, however, that the individual
does not have such a close working relationship with the organization he is
analyzing that some element of objectivity is not possible, and that he is not
antagonistic towards the group in question.

Individual respondents can also be assigned organizations to examine on a
self-selecting basis, where each chooses the organization he feels best able
to analyze. One respondent, moreover, can analyze several of the organizations
identified as relevant to the conflict, provided he has dealt with those
organizations in the past, and is familiar with the different aspects of
organizational authority, roles, and power that are the subject of Query.

If a subunit of an organization typically handles one type of instream
flow conflict--such as dams or reclamation projects--that group of individuals
should be involved in the analysis whenever that type of conflict arises.
This is because these people are likely to be most familiar with the issues
and organizations involved. (They are also in a better position to be able to
identify those organizations which, though not <u>yet</u> directly involved in the

conflict, are likely to participate at some future point in time, as the negotiations progress or the conflict expands.)

The choice of individual respondents is as important as the identification of relevant organizations because the questions contained in Query are designed to tap the knowledge individuals have about issues and organizations based on the past experiences.

Once the organizations have been identified and three different respondents assigned to each, the respondents individually analyze the organization(s) assigned to them using the questionnaire contained in Query.

5.3 PHASE I: QUERY: SURVEY OF AUTHORITIES

Query begins by asking the respondent several preliminary questions including: the analyst's identity, a list of the various organizations to be included in the overall analysis, and the time and date of the analysis. The analyst is then asked to identify the specific organization being analyzed and to describe two major aspects of that organization's behavior: (1) the legal authority that organization has to participate in the conflict; and (2) the major issues and goals involved, from that organization's point of view. The answers to these serve two purposes in LIAM. First, having to describe a conflict in this manner helps a respondent to clarify facts and ideas regarding the issues, and to begin to look at the conflict from a different perspective. Second, as this is done for each of the organizations involved, the respondents (together) begin to build a foundation of legal information that will prove useful in later analyses and in developing an overall understanding of the conflict.

It is here, also, that the respondent is asked to indicate the type and degree of statutory authority the organization has to participate in the conflict. Although the information for these questions may be generated prior to running Query (ideally, it should be gathered beforehand), each respondent needs to complete this answer for the organization he is analyzing. Thus, a survey needs to be made of the State and Federal laws surrounding the conflict. This may be done by one of the respondents, all of them individually, or at a group meeting prior to running Query.

Since each organization will have its own view of the issues involved, it is important to discover and describe these in this section. This is because the respondents need to begin to perceive the conflict from other points of view, so that relevant and persuasive communication strategies can be developed. Once these facets of the problem are described, the traditional section of the model is complete and the program automatically moves on to the behavioral elements of LIAM. The first of these helps the respondent determine the role types that will come into play. The computer stores the answers given in this first section, however, so the analyst can utilize the information in developing strategies for participating in the bargaining that will ensue. In addition, the responses taken in this first section, especially those relating to the legal context of the issue, may be useful in answering questions contained in other sections of Query. For example, some questions

50

ask the respondent to indicate the degree of authority (as an element of power) an organization will bring into the conflict. Since the analyst has already determined this, the answer will likely come readily to mind; if it does not, the information is available for review using Looky.

5.4 PHASE II: QUERY: ROLE ANALYSIS

The second set of questions in Query permits the respondent to describe the behavior patterns that are expected to emerge for each organization involved. A series of behavioral statements is presented, and the respondent is asked to identify the degree to which that statement applies to the organization. These statements were developed from the four role types typically associated with organizations involved in resource issues (broker, arbitrator, advocate, and guardian). Each question attempts to measure the degree to which organizations are expected to exhibit each type of behavior. The answers are coded on a scale from one to five. The most extreme response choice is coded five, while the least extreme is coded one. No response choice was coded zero, however, since it is reasonable to assume that, by virtue of participating in the conflict, each organization will interact with the other organizations involved, at least minimally. Thus, some type of behavior pattern is expected for each. If no individual can be found having enough experience with an organization to comfortably attempt analysis, individuals outside the group conducting the analysis can be found to provide the necessary information.

Each of the four role types has several "behaviors" associated with it, which together make up a distinct pattern. These expected behaviors were used as the basis for developing the question set for each of these roles. The role type "arbitrator" has been identified as having four behaviors: (1) preference for objectivity in decisionmaking; (2) whether or not it will preside over a formal decision process (as does a court); (3) the degree to which it is expected to solicit information from all sides to a dispute; and (4) whether or not it tends to have the authority to establish rules or promulgate regulations in conflicts of the type being analyzed, or to determine the ultimate decision outcome. The broker has a different set of behaviors: (1) the degree to which it promotes a negotiated or consensual outcome; (2) whether or not it has physical or legal control of the resources involved; (3) the degree to which it prefers to consider or use economic, constituency, or political information in resource decisionmaking; and (4) whether or not it will attempt to see to it that all parties to a dispute are somewhat satisfied with the outcome. All of these elements of behavior, it should be noted, are related to preferences for--and behavior associated with those preferences--one decision arena or the other (regulatory/distributive). Thus, these behavioral patterns stem from organizational preferences for procedure, rather than specific outcome.

The other two roles, advocate and guardian, relate to goal preferences. An advocate organization prefers environmentally protective outcomes, and its behavior reflects this preference. Thus, the questions in Query attempt to measure the degree to which an advocate is expected to: (1) attempt to change traditional patterns of resource use and management, which considers economic

51

and political factors to be more salient than environmental ones; (2) show a preference for and use of scientific and technical information over economic or political facts; (3) promote environmental values; (4) demonstrate an ideological adherence to the mission of "environmental protection;" and (5) react to projects and proposals initiated by others. A guardian exhibits behaviors that are the mirror image of those of an advocate, and the questions in Query measure the degree to which this is the case.

All of these role-related questions are presented to the respondent in random order by the Query program. This is done so that the respondent will be unable to anticipate questions and will have to think out the answer to each question prior to responding. Furthermore, each type of question has been phrased in three different ways; the computer randomly selects one of the three to measure each of the particular behavioral components. Thus, no two questionnaires will ever be exactly alike. The point is to force the respondent to carefully analyze each organization for each resource conflict, not just respond in a rote manner, based on familiarity with the questionnaire.

The computer retains the answer for each role question, assigns it a numerical score, and combines the scores given for all of the questions associated with each role type. In this manner, a score for each role type is generated for each organization examined. The combined score for each role type is called an index, and these indices determine the specific behavioral patterns that organization is expected to exhibit, along with the degree to which it is expected to do so. This is done by separating the index scores (one for each role type) into two sets; one set of indices represents behaviors associated with preference for procedure (broker/arbitrator), while the other represents behaviors associated with preference for outcome (advocate/guardian).

For each set of indices, the smaller index score is subtracted from the larger one along each of the two dimensions (broker from arbitrator, or vice versa; advocate from guardian, or vice versa). This is done to get closer to the element of degree. Since "ideal" role types are extremely rare--if not nonexistent--an organization that scores high on all measures of the broker role type is likely to also exhibit behavior commonly associated with arbitrators, even if only to a minimal degree. Since an arbitrator is located at the opposite end of the broker-arbitrator continuum, however, this score must be subtracted from the score obtained on the broker index in order to determine just how extreme that organization's brokering behavior is apt to be. The difference between the two indices indicates that organization's location on a particular behavioral continuum--or, the degree to which that organization can be expected to exhibit that type of behavior. For example, if an organization scores 4, 3, 4, and 4 on the questions related to broker, these numbers are added by the computer and an average "broker" score is calculated by dividing that sum (15) by four. Thus the broker score for this organization is 3.7. Further, if the same organization receives 2.0 as its arbitrator score (calculated in the same fashion), then the computer subtracts 2.0 from 3.7, to arrive at a final broker index of 1.7.

The same process is used to locate that organization on the second continuum, associated with goal preferences. If the hypothetical organization in

the above example receives an advocate score of 1.0 and a guardian score of 3.0, the final score on this continuum would be 2.0, in the direction of guardian. Both indices, then, are used to define an organization's expected behavior pattern. An organization with these scores can be said to be 1.7 points toward the broker role type, and 2.0 points toward the guardian role type--or to be a "Broker-Guardian." The larger score (between the one behavioral dimension and the other), moreover, is that organization's dominant role type; in the above example, the dominant role type is that of broker. Figure 8 illustrates the location of this hypothetical organization on a "behavioral map." This map gives an analyst, once all the relevant organizations have been located on it, a pictorial representation of the distribution of the four role types for a given conflict.

As previously mentioned, roles are not the only important predictive factors within LIAM. Power must also be examined.

5.5 PHASE III: QUERY: POWER ANALYSIS

As was the case with roles, a series of power statements is presented, and the respondent is asked to indicate the degree to which the statement is applicable to that organization. These responses are also scored and stored in the computer's memory, in the same manner as the scores obtained for the various roles. The questions relating to power were created to tap all three elements of power that an organization may bring to bear in a conflict: resources, information or expertise, and support (Rourke 1976; Benveniste 1977; Clarke and McCool 1985).

The first type of question asks the respondent to identify the degree to which an organization has at its disposal such typical organizational resources as: statutory authority to act or decide, physical or managerial control over resource systems, public support, personnel, fiscal resources, political support, and frequency and intensity of involvement in such issues.

The first six factors give one an idea of the potential power an organization may have to influence the outcome, while the latter two indicate the likelihood that it will go all out to do so. The more often an organization has been involved in similar conflicts, the more experience it will have behind it; and the more intensely it feels about the outcome, the more aggressive will be its behavior in that regard (Rourke 1976; Clarke and McCool 1985).

The second category of power-related questions concerns the type and quality of expertise with which an organization is typically identified; whether or not the organization is dependent on other groups for relevant scientific and technical information; as well as the respect the professionals within that group--and the group as a whole--have earned for themselves in a scientific field or academic discipline. Other factors measured here include the clarity of methods used and the degree to which the results obtained using those methods are understood by other participants and decisionmakers. Given the highly technical nature of instream flow issues, an organization in the business of generating information relevant to a particular issue or type of
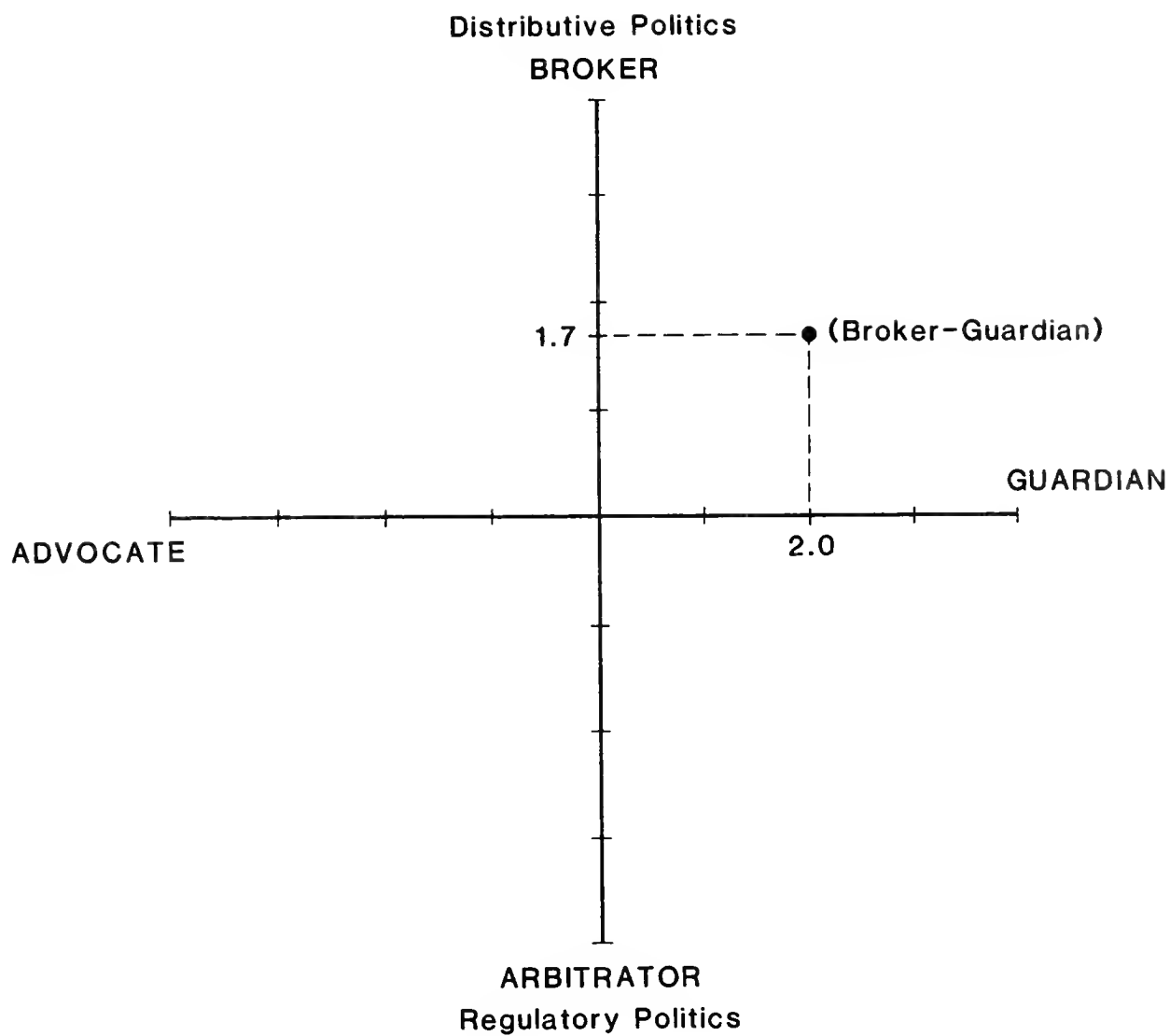
Figure 8.   The location of a Broker-Guardian on an LIAM role map.

issue may often find itself in an influential position because of that fact. The power to persuade is directly related to the the ability to convince others--and in resource issues, this necessarily involves data collection, interpretation, and dissemination. The more capable an organization is in this regard, the more likely it will be able to persuade others (Benveniste 1977).

The third category of power-related questions concerns the amount and type of clientele or interest group support (referred to within LIAM as "constituency support") an organization has behind it in general, but especially with regard to the conflict at issue. This part of the question-naire is separated from the previous two, and begins by asking the user to identify the support groups associated with the organization. These can be groups that are already tangentially involved in the conflict and that may support the organization because of similarity of goals, or groups may become involved at some point in the future on behalf of the organization and its goals. The respondent should attempt to identify and list both types of support groups that are associated with the organization he is analyzing. If none are identified, the computer assumes a zero score for power in this category.

Once again, a series of questions or statements is presented to the respondent, asking the degree to which each applies to the relationship between the organization being analyzed and its support groups. These questions concern the type and number of support groups; the degree of involvement these groups typically have in issues such as this, in terms of both frequency and intensity of that involvement; group cohesiveness and organization; the level of public support the groups have or are likely to be able to generate; and the amount of political skill and prestige the groups generally have (Rourke 1976; Clarke and McCool 1985; Smith 1985). As each question is presented to the respondent, he selects from the response choices offered the one that best describes these groups in relation to the organization being analyzed. As was the case with roles, an index score is constructed for each type of power associated with an organization (resources, expertise, and constituency support).

This process is repeated three times for each organization involved in the dispute. Once this has been accomplished, the analyst has a complete file on the conflict that contains all the necessary information to analyze the conflict using Mapum. Prior to this, however, a user should examine the information using the second major program, Looky.

5.6 LOOKY

"Looky" allows the analyst to "look" at the responses recorded in Query prior to analysis--for purposes of review, rearrangement, or revision. A number of options exist in this program.

First, the list of organizations examined and the list of individual respondents who answered the questions can be reviewed. This should be done to ensure that each organization identified as important is contained in the file and that each was examined (using Query) the requisite three times.

Second, answers can be altered as new information becomes available, factual circumstances change, or new organizations enter the conflict. Looky offers the respondent the option of changing the answer previously given, for example, just in case erroneous information was included for an organization. If other organizations become involved in the issue, the analyst can simply run Query on these groups, and the new information will be automatically added to the file.

Finally, an analyst may examine the index scores calculated for a given organization, as opposed to answers given for particular questions although the latter can also be accomplished by Looky. Indices are reported in the program for all role types (broker, arbitrator, advocate, guardian), as well as for the three power components (resources, expertise, constituency support). All indices are calculated on a scale from one to five. The less an organization is identified with a particular role type or has of a particular power component, the smaller the index score reported for that element. If the respondent desires, he can calculate (by hand) the dominant role type, as well as the degree of behavior, for any or all of the organizations. The index-reporting option is provided so that scores that seem unreasonable or data gaps can be identified and examined. Once it is determined that the information is complete and accurate, the analyst may go on to "Mapum," which contains the analytical part of the model.

5.7 MAPUM

Six types of information are produced by Mapum. First, there is a numerical score (index) for each of the four role types and the three types of power.

Second, these scores are used by the computer to plot the location of the organizations on a "role map" (Figure 8). Each organization is assigned a location on the two behavioral continuua discussed earlier. The resulting map gives the analyst a pictorial representation of the distribution of organizations among the four major role types. This information can be used by the analyst to develop strategies for participating effectively in the conflict.

Figure 9 is an example of a role map containing various hypothetical organizations, which can be interpreted as follows. The arcs dividing the four major quadrants have been calculated as a function of the average distance from the point of origin of the organizations located in that quadrant. That is, for all organizations located in a particular quadrant, the numerical distance for each organization from the point of origin (or zero) is calculated; these scores are then added and averaged. The mid-point arc is then drawn in that quadrant as a function of the averaged score. This is done so that the intensity of each organization's expected behavior is reflected as a relative function of the other organizations in that quadrant. Six organizations appear in the upper left-hand quadrant. Two of these are located very close to the point of origin (in subquadrants A and B); relative to the other organizations appearing in this quadrant, these two groups can be expected to be moderate players. The most extreme players are located in subquadrants I and M, which are also the subquadrants in which the most players appear.

Thus, just by examining the distribution of players on the map, one can begin to develop a sense of the degree of polarization that is likely to evolve in this case, especially since the polarization will be in terms of preferences for outcome. Advocates and guardians are both, after all, driven by ideological values that are opposite. The further out on the continuum an organization is located, in either direction, the more extreme the behavior is likely to be. The other most intense player is located in subquadrant J; thus, it appears a broker will try to take charge. This particular broker seems to lean slightly toward the advocate organizations in terms of goal preferences.

The third type of information generated by Mapum has to do with the predicted roles associated with each organization. For each organization that appears on the role map, a behavioral description is given according to the subquadrant into which it falls. In the example above, the program would provide the descriptions of expected behavioral patterns, taken from those that appear in Appendix I and associated with a particular subquadrant. For example, for an organization appearing in subquadrant A, the following would be reported:

A.   MODERATE ADVOCATE-BROKER: Is protective of environmental and non-economic values and will join forces with others to resist proposals or projects that threaten those values. Will cooperate in efforts to change the ways in which resources have been used and managed in the past, and will contribute to crusading efforts initiated by others on behalf of the environment. Will use scientific and technical data to support its position. Also prefers a negotiated outcome, in which decisions are a result of bargaining among players. Thus, it will not resist efforts to keep or push the conflict into the distributive arena. Will be somewhat open to compromise.

To fully understand a resource conflict, the analyst would examine all of the behavioral descriptions reported, as well as the distribution of power among the organizations.

Fourth, are the numerical scores used to place the quadrant arcs on the role map. These arcs (see Figure 9) serve to differentiate among role intensities within the same quadrant. Intensity of role is a relative concept within LIAM, rather than an absolute one, and depends on the location of the players in the four quadrants vis-a-vis each other and the point of origin on the map. If only one organization falls within a quadrant, for example, the arc is drawn in an absolute sense, and is placed exactly in the middle of the quadrant by the computer. This information is reported primarily for those who are interested in calculating the arc locations by hand, for purposes of comparison with the computer's output; these numbers also allow the analyst to get a better sense of the manner in which the arcs are calculated and drawn on the behavioral map. For example, in Figure 9, seven organizations appear in the lower right hand quadrant. The arc for that quadrant was calculated as a numerical function of the distance of each of the seven organizations from the center of the diagram. The seven distances were added, and the sum divided by seven. The arc was plotted at that point by the computer. Three of these
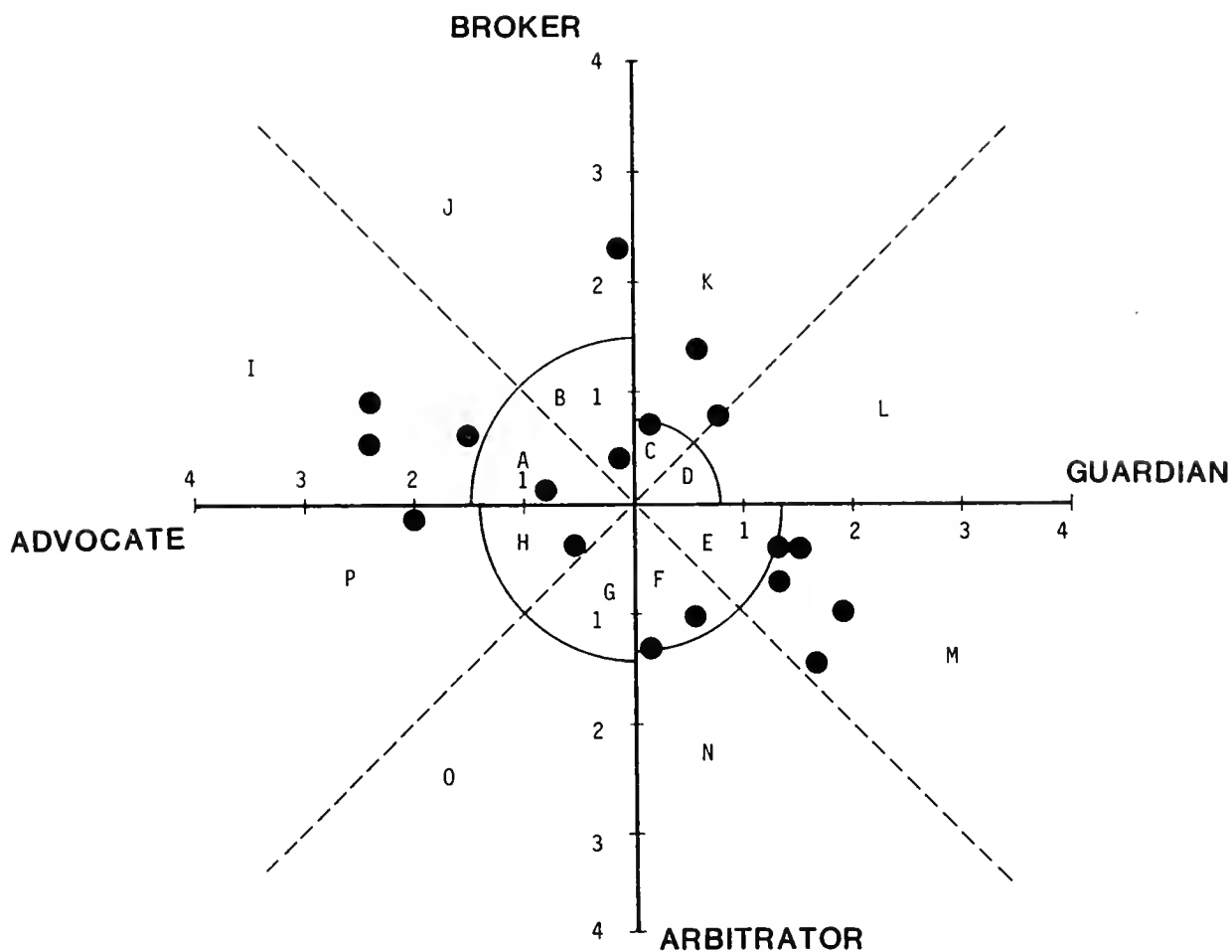
Figure 9. The location and distribution of many typical organizations on an LIAM role map.

organizations are located on or within the arc--and are expected to be moderate players. The behavior of the other four groups will be extreme, relative to the other three.

All of this information and output from Mapum is then utilized to develop an understanding of the conflict, and to develop strategies for participation in its resolution. This is accomplished in the final phase of LIAM.

Fifth, a graph (Figure 10) of the powers of each organization is provided, for all three categories. Three-section power columns, each section representing one of the major types of power examined within LIAM, are created for each organization. Each column is divided into three sections, and each section represents one of the elements of power previously discussed. The sections themselves are drawn as a function of the power indices created by the analysts for each organization, and reported (as a numerical figure) in Mapum. These columns also give the analyst a pictorial representation of the strengths and weaknesses of the organizations examined, and the distribution of power among them. For example, group 2 in Figure 10 is the most powerful of the three organizations here, and the resource power it appears to have is its greatest source of strength.

Sixth, is the "perspective plot." This plot (Figure 11) indicates the positions of all the other players from the viewpoint of and relative to whatever organization the user chooses to select. Generally, the point of view of interest is that of the organization conducting the analysis; however, perspective plots can be drawn from the point of view of whatever organization the analyst selects. This plot gives the analyst an idea of the distance of the other organizations from his own group's perspective (vertical axis) as well as the power differences involved (horizonal axis). The location of the organizations along the vertical axis is determined as a function of the distance between the various organizations on the LIAM role map, and reflects the role differences between them. The location of the organizations along the horizontal axis reflects the power differences among these groups. This plot sheds a somewhat different light on the conflict than does the role map, however, since it indicates the relative positions of the other organizations from one particular organizational point of view. For example, in Figure 11, while all three groups appear powerful vis-a-vis one another, groups 2 and 3 are located quite a distance from group 1--yet close to one another. Perhaps these groups, if they combined resources, may be able to push the conflict in a direction to which group 1 would be strongly opposed. At any rate, it is a potential development that group 1 might want to examine further, and to consider when developing strategies.
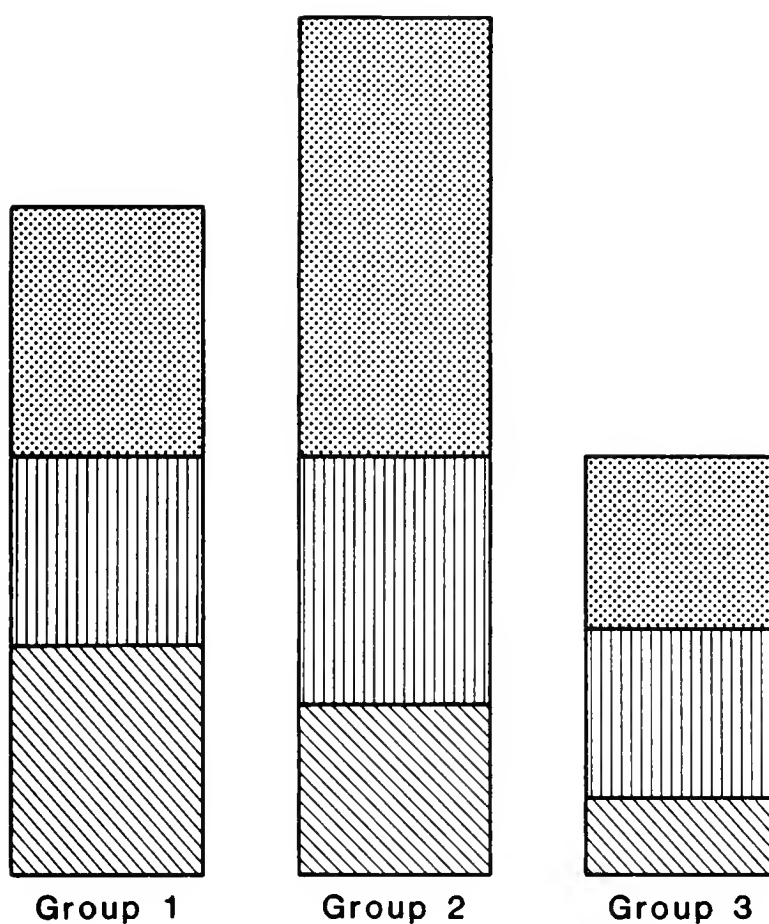
Figure 10. An example of three-sectioned power columns provided to users of LIAM.

ROLE
DIFFERENCES

```
                                                          ✳
Group 1 |BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB


Group 2  CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC

Group 3  AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
```

POWER
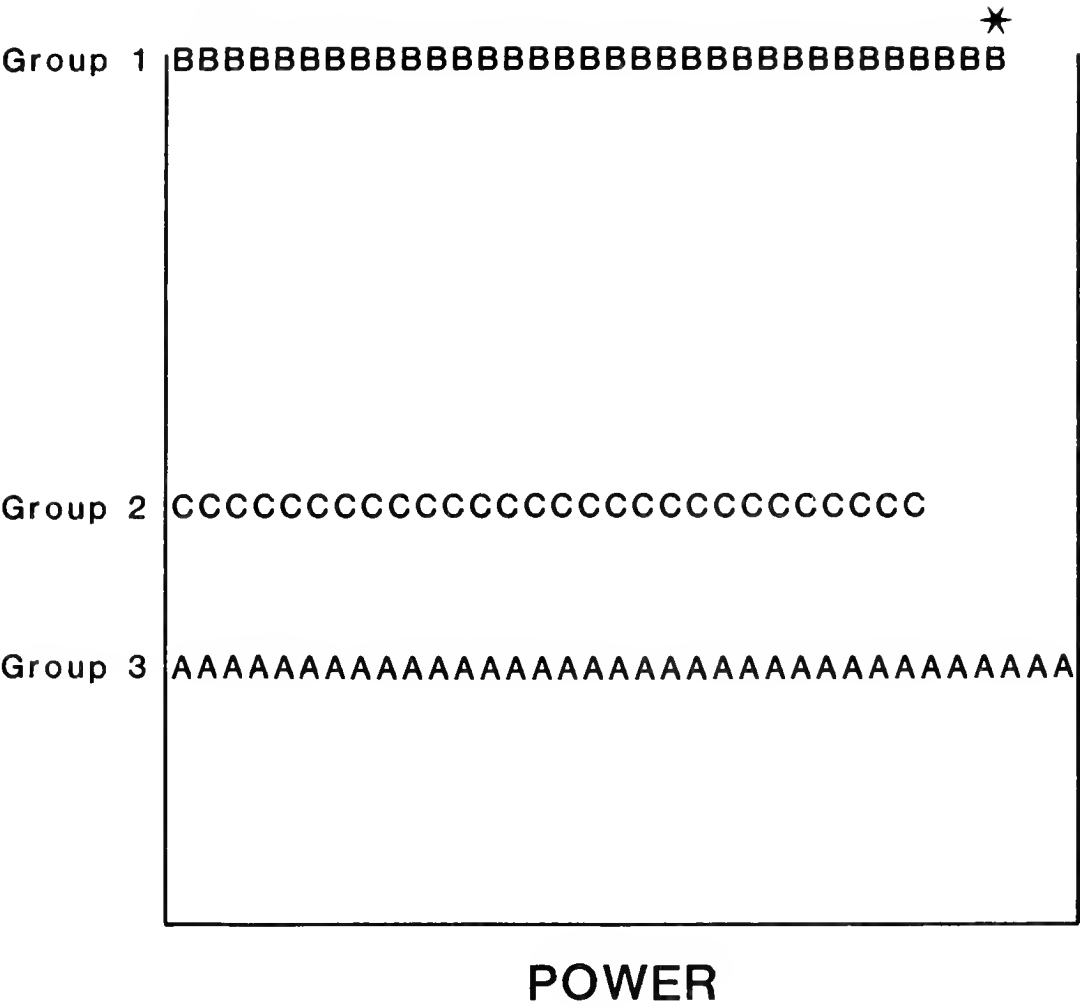
Figure 11. An example of a perspective plot provided
to users of LIAM (see text for explanation).

6. PHASE IV: BEHAVIORAL ANALYSES AND STRATEGY DEVELOPMENT

It should be clear at this point that behavioral analysis and strategy development are the elements of LIAM that depend most heavily on the experience and sensitivity of the user. No magic formula exists that will provide clear-cut answers to the question: What now? The answer, if there is one, is simply: it depends. There are some concrete steps one can take, however, towards strategy development. First, a task group must be formed to analyze the results of LIAM and select the most appropriate strategies.

6.1 FORMING A TASK GROUP

A subset of the respondents who previously participated in the LIAM process should be selected for the task of developing participatory strategies. This is because these individuals will be familiar with the model and, by virtue of having analyzed one or more organizations themselves, will be aware of the type of results obtained. These individuals should be from the organization sponsoring the analyses, since the strategies they develop will be on behalf of that organization. Members of that organization are also more likely to have the necessary amount of interest in the final stage of LIAM to motivate them to pursue the assignment with energy.

This subgroup should be large enough so that more than one viewpoint is considered, but not so large that management of the group's activities becomes impossible. Three individuals of the types suggested by Scheele (1975) are recommended, so that a balance can be struck between intensity, objectivity, and organization. A moderator is also recommended to facilitate the proceedings and record the outcome.

In a series of meetings, this group brainstorms together, led by the moderator and informed by the results of LIAM, to identify a list of possible strategies and tactics. The items on this list could then either be voted upon within the subgroup itself--roundtable fashion--or distributed to all members of the organization or the original analytical group using the Delphi technique. A number of factors must be considered by the group, however, prior to making final decisions. Each of these is treated separately in the following paragraphs.

6.2 CONTEXT OF THE ISSUE

Gifford (1985) has identified three negotiation strategies that relate to the context in which a conflict occurs: competitive, cooperative, and integrative. Understanding the context in which one has to negotiate is

crucial to selecting appropriate negotiation strategies (Ingram et al. 1984; Harter and Eads 1985).

The competitive strategy is the one most frequently written about in the literature on negotiation (Nirenberg 1977; Cohen 1980; Gifford 1985). This approach assumes a zero-sum game in which one party's gain is necessarily another's loss. It also assumes that the resources at stake are limited and that all parties value the same elements of the disputed resources. This approach is an adversarial one, in which the tactics are designed to maximize one's own gain by convincing the other participants to settle for less. These tactics include: making a high initital demand, partial and reluctant disclosure of information, few and small concessions, inflexibility, the use of arguments and threats, and the taking of strong positional stands. There is a fear of image or positional loss, and the concessions of the other side are often taken as a sign of weakness (Menkel-Meadows 1984; Gifford 1985).

The cooperative strategy emphasizes compromise as a legitimate means to a fair and equitable result--even when the parties are deciding how to divide a limited resource. The idea is to build and maintain organizational relationships based on trust. Thus, a negotiator using this approach makes a fair opening bid, values concessions, initiates concessions to create the obligation to reciprocate, expects reciprocity, is accommodating of the needs of the other parties, and attempts to maintain or even enhance the interorganizational/interpersonal relationships involved (Lowenthal 1982; Gifford 1985).

While both the cooperative and competitive strategies focus on the opposing positions involved, and each tries to obtain as many concessions as possible from the other side, an attempt is made with the third approach to reconcile the parties' interests. The integrative strategy is most successful where the parties' interests are not directly opposed, and where the issues at stake are numerous and diverse. Here, the negotiators seek to: identify complementary interests, invent solutions, promote positive-sum results in which one party's gain is not necessarily another's loss, separate the people from the problem, focus on underlying interests and needs--not positions, develop objective standards by which to judge options, and exchange information freely (Gifford 1985).

Several factors should be considered prior to selecting the optimal negotiation strategy for a particular conflict. The most important of these is the negotiating style of the other parties. This is because the competitive strategy can be used to exploit organizations using a noncompetitive approach. If a negotiation process is dominated by an organization using the competitive strategy, the other organizations may be forced to adopt this strategy themselves--or risk exploitation. Two key elements in making this determination are strategies adopted by the other organizations in the past and the negotiation styles exhibited at the beginning of the negotiation process. An organization that generally or initially adopts the competitive approach is likely to continue to do so, unless it can be convinced otherwise (Gifford 1985).

The second factor is organizational power: How powerful a player is a particular organization likely to be? An extremely powerful organization can

use the competitive strategy with minimal risk to itself. Threats, for example, work better--and lead to more concessions from the other side--when made by powerful players. Noncompetitive strategies, of course, are best for low-power players. Less powerful organizations have three options in this situation: increase their own power, decrease the power on the other side, or convince powerful competitive organizations to adopt a noncompetitive approach (Gifford 1985). When an organization is confronted with an extremely powerful opponent, it may have no choice but to play a competitive game.

A third factor is deadlines--real or artificial. When an organization is under the pressure of a deadline, the competitive strategy should be avoided. This is because competitive negotiations are the most likely to break down. If an agreement is mandated by law, cooperation is most likely to come from those organizations standing to lose the most if an impasse occurs. Indeed, the threat of litigation often provides a powerful incentive for compromise (Clyde 1985). Delay tactics, then, may convince even powerful, normally competitive organizations to consider an alternative approach (Gifford 1985).

Finally, if an organization is interested in maintaining trusting and long-term relationships with the other parties, a noncompetitive approach is best (Gifford 1985). Since many of the organizations are repeat players in the resolution of instream flow issues, interorganizational relationships are highly valued.

Once a competitive strategy has been ruled out, a choice must be made between the two noncompetitive approaches. In general, the cooperative approach is most suitable in a zero-sum game, in which a limited amount of resources are to be divided among the players. Conversely, if the conflict is--or can be converted into--a positive-sum game, the integrative approach is best. In positive sum games, the gain of one party does not necessarily have to result in losses for the other side. The potential exists for all sides to a conflict to benefit. Further, the more issues there are, and the more diverse, the greater the potential for identifying trade-offs, a crucial ingredient of the integrative approach. Last, the greater the need for a timely resolution of the conflict, the more appropriate the cooperative approach--rather than the integrative one. This is because, of the three approaches examined here, the integrative is the most time-consuming (Gifford 1985).

In determining the most appropriate approach to a particular negotiation, the output from the computerized version of LIAM is worth examining closely. First, the role map provides an analyst with a pictorial representation of the organizations participating in the conflict as they are distributed among the 16 subquadrants on the map. The analyst is also provided with the numerical scores--indices--for each organization analyzed, for each of the four major role types. Indices for each of the three power variables--resources, expertise, and support--are also provided, along with a pictorial representation of these scores in the form of power columns for each organization. Finally, the analyst is provided with a description of the behavior that is predicted for each of the organizations analyzed, based on its location on the role map (see Appendix I for all of these descriptions). The role map, moreover, can be directly related to one of the three strategies outlined above.

Figures 12 and 13 illustrate two different role maps that are similar in one major aspect: each depicts a conflict with few--yet highly polarized--players. All organizations in these examples are extreme in their respective preferences. In this situation--or one like it--an analyst should examine the power of the other player carefully, as well as the behavioral description associated with the subquadrant in which the opponent is located: Powerful players are advantaged in a highly competitive negotiation, and past behavior is frequently a good indication of what is to come. If the other organization is extremely ideological in terms of the type of outcome it seeks to promote, compromise may be difficult, especially when the issues--as may be the case with so few players--are major and limited. Two other facets of the conflict may also be important: the presence/absence of deadlines and the desire of both parties to maintain or enhance their working relationship. An extremely ideological, powerful organization that frequently engages in competitive bargaining can make a powerful opponent, especially in the absence of an urgent need to reach an agreement. An organization preparing to enter a highly competitive negotiation such as this needs to cover a number of bases. This includes developing a set of initial (and high) demands, from which it will be possible to retreat incrementally, as well as a bottomline position beyond which further concessions cannot be made. "Throw-away" items need to be identified--points that can be conceded easily, without damaging important interests. Timely concessions may facilitate reciprocity from the other parties, provided not too much is offered too soon. One can typically expect arguments or threats from the other side, and should be prepared to identify and call the bluffs from the other side.

It may be preferable, however, to encourage more cooperation. For example, it may be helpful to emphasize the importance of a fair and equitable result, or the need to develop and maintain trusting interorganizational relationships (Eavey and Miller 1984; Gifford 1985). One can also identify the most likely and powerful competitive players, and seek to build a coalition among the other organizations to balance the distribution of power. Cooperation is more likely among relatively equal players.

When the conflict is essentially bipolar, as is the case in Figures 12 and 13, and it is difficult to anticipate the outcome, it may be possible to use the "uncertainty" element to persuade the other side to cooperate, rather than risk losing altogether (Hoffman 1968; Mulford and Rogers 1982). Players adopting this tactic, however, need to preserve the perception that a wider, more costly conflict is possible (Hoffman 1968). Another highly persuasive tactic in a bipolar conflict is one of "irreversible commitment." In this case, an organization makes a statement of absolute commitment to a particular policy outcome in such a way that it is clearly understood: either the desired outcome is achieved or all parties lose--through the time and expense of litigation, for example, or from an expansion of the conflict. The threat must be credible, of course, for this tactic to work. The organization extending it must be willing to follow through, or be able to convince the others that it will do so. Ideological extremists and/or very powerful players are most likely to adopt this tactic. It is more likely to work, however, when the decisionmaker is not actively involved in resolving the dispute, or when there is no decisionmaker. In this latter case, agreement among the parties may be mandated by statute.

Figure 12.   Likely scenario for competitive negotiations: a first cut.
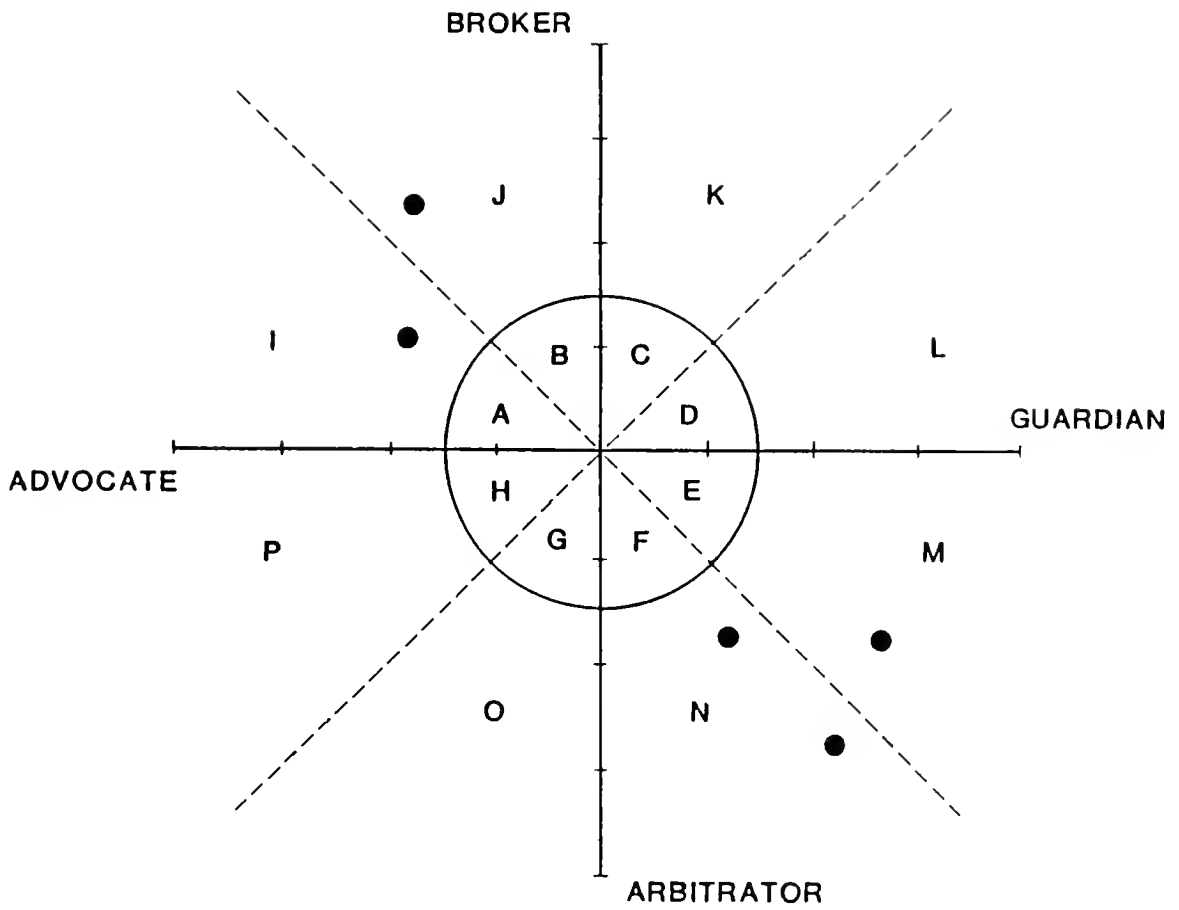
Figure 13. Likely scenario in competitive negotiations: a second cut.

Figures 14 and 15 illustrate two configurations of organizations likely to engage in cooperative bargaining. In both cases, agreement on process seems certain, and all players are located in moderate positions with respect to the goals preferred by each.

In Figure 14 the organizations are all located in the upper half of the diagram, indicating a preference for operating in the distributive arena. The essence of distributive policy is the distribution of policy benefits accruing from a policy decision; conflicts typically are resolved in face-to-face negotiations; and compromise between initial positions generally results (Ripley and Franklin 1984). This is especially true, of course, if the groups are ideologically connected in some way (Axelrod 1970; Browne 1973). Since the basis for making a distributive decision differs dramatically from that used in the regulatory arena, however, the analyst should further investigate the types of power each organization has at its disposal. For example, public and constituency support are frequently valued more than data when a decision is to be brokered (Beckett and Lamb 1976; Lamb and Doerksen 1979). Interest groups also play an important role in brokered decisions (Rourke 1976; Smith 1985). And finally, an analyst facing this situation must consider the number and types of issues involved, the need for a timely resolution of the conflict, and the ideological preferences of the organizations involved. The more numerous and diverse the issues, and the greater the need for immediate resolution, the more appropriate will be the cooperative strategy. Further- more, organizations that are predicted to exhibit a moderate preference for a particular set of goals are more likely to offer the necessary concessions to make a cooperative negotiation successful.

In Figure 15, the decision is likely to be arbitrated. In the regulatory arena, information is presented by all parties to a conflict, and the arbitra- tor objectively selects the proposal that appears to offer the "best" solution to the problem (Beckett and Lamb 1976; Doerksen and Lamb 1979; Ripley and Franklin 1984). Data carries more weight here than do the political facts preferred in distributive arenas. Thus, the analyst should examine the power differentials among the organizations. Resource power is reflected by the degree to which an organization is able to fund studies to support its position, its expertise index, and its backing by interest groups.

One tactic that is useful in a cooperative negotiation is to identify the general boundaries within which all groups agree to work. Flexibility is maintained within these boundaries, however. Those adopting this approach work together to identify those general areas--either procedural or sub- stantive--on which agreement can be reached, and then iron out the specifics, in terms of outcome, as the negotiation proceeds. Two examples are: (1) tacit agreement on the rules of the negotiation process itself, such as "no political appeals to the media, politicians, or currently uninvolved interest groups," "no giving of false or manipulative information," or "no personal attacks;" and (2) tacit agreement on substantive issues, i.e., appropriate methodology or the number and type of alternatives. In this case, however, the opponents must perceive a need to coordinate, but be so ideologically or geographically separate that they are unable to communicate openly with one another (Hoffman 1968).
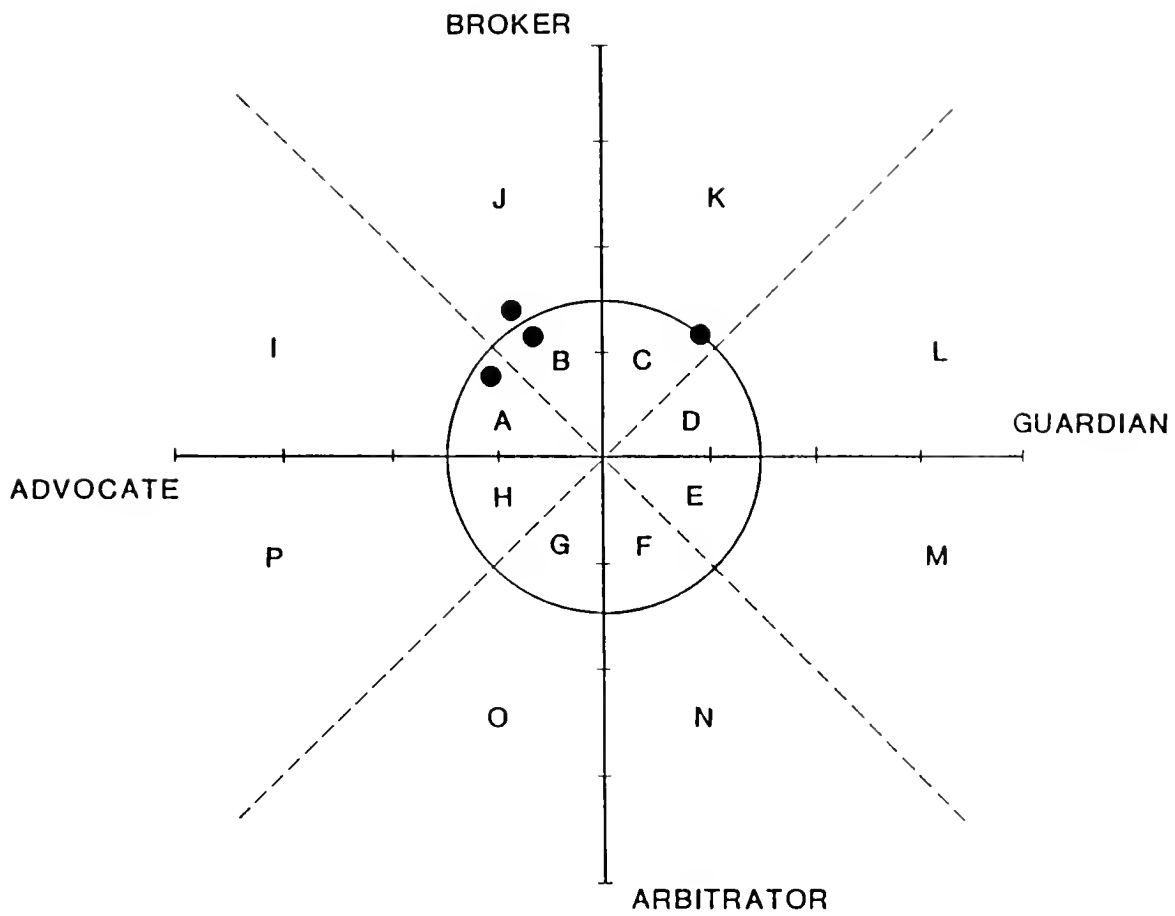
Figure 14. Likely scenario for cooperative negotiations: a first cut.
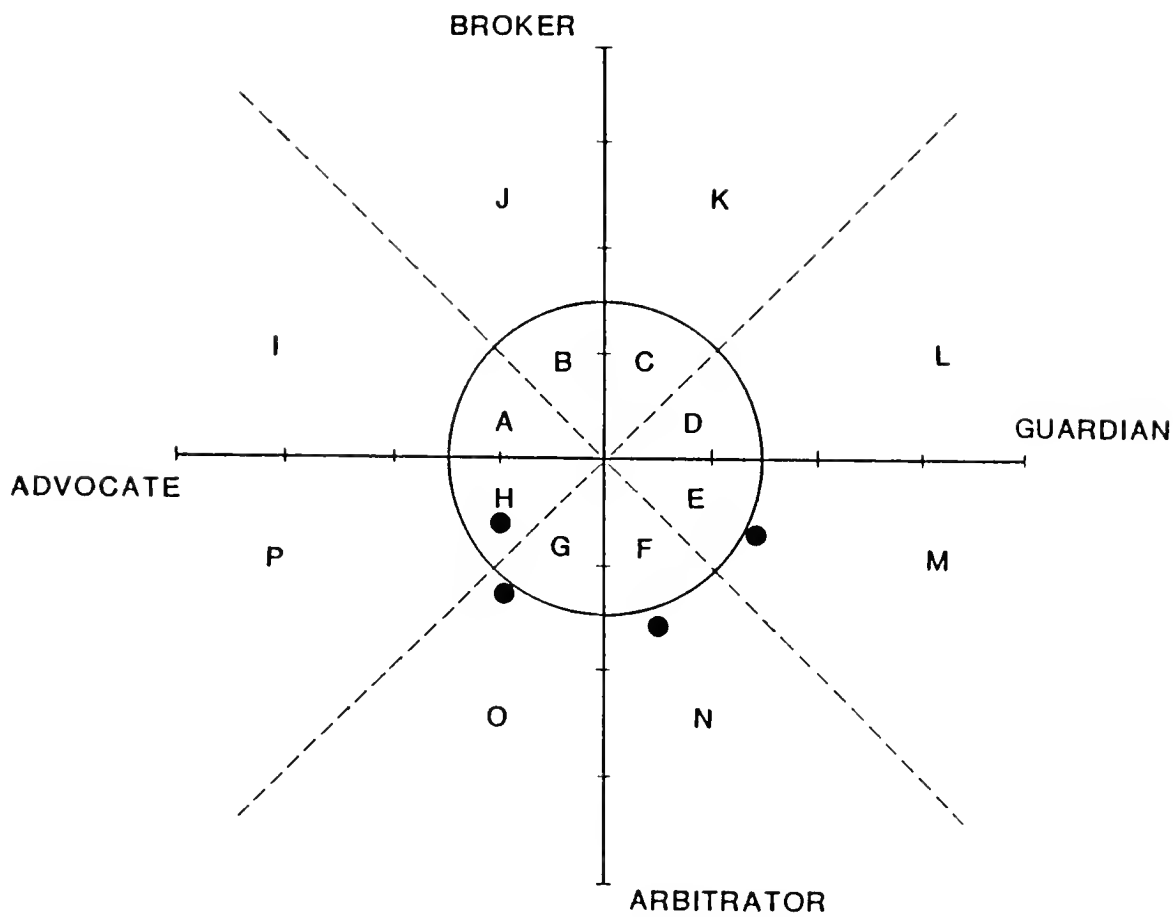
Figure 15. Likely scenario for cooperative negotiations: a second cut.

The third approach--integrative bargaining--is demonstrated in Figures 16 and 17. In both cases, while there appears to be little or no agreement regarding procedure, all are in agreement on type of outcome. Typically, each side will attempt to pull the conflict into the arena in which it operates most comfortably, and from which it expects to benefit the most. If an integrative approach is successful here, however, polarization can be avoided. The probability of success is enhanced in this regard if information is freely exchanged among the parties. The integrative approach works best when there are many and diverse issues and when time is not an important constraint. There must be some possibilities for expanding or creatively manipulating the tradeoff potential; that is, the game must be positive-sum. For example, in a conflict between an endangered fish species' need for additional habitat and the existence of limited opportunities (during spring runoff) for white-water rafting, the rafting opportunities may be relocated to a different river system where rapids are more plentiful, in exchange for the habitat. Since all players in these two cases are in ideological agreement, the opportunities for log rolling and trade-offs across specific issues can be increased in a positive-sum game.

Three tactics are most helpful in an integrative negotiation, or in a situation where the parties are attempting to engender such a climate. First, the parties brainstorm together to develop objective standards upon which to base the decision--and to which all parties agree (Fisher and Ury 1981; Gifford 1985). Second, the issues where agreement is most likely are selected and dealt with first. This frequently sets the stage for compromise among the parties and creates an atmosphere of trust. And, finally, before opposing views on the issues solidify, it is important to anticipate major problems before they arise. Here, the parties identify the potential problem areas, where agreement seems most difficult. The groups then work together--perhaps with the help of a neutral third party--to generate a wide range of options for solving the potential problems (Clark and Emrich 1980; Fisher and Ury 1981; Gifford 1985). When the issues are many and diverse, moreover, it is a good idea to break them into smaller and more manageable units, and then to work with several issues simultaneously. This increases opportunities for trade-offs among the parties and leads to fairer results than working with one issue at a time. Indeed, working with one issue at a time may not only be inefficient but also tends to increase the potential for conflict among the parties (White et al. 1980).

These examples are offered to give an analyst an idea of the different organizational configurations that may occur in any given conflict, as well as the types of negotiations that are likely to result.

Another possibility that must be considered has to do with the formation of coalitions among the players, not only among the direct participants, but between these organizations and their real and potential interest group allies.

6.3 COALITIONS

A coalition is defined here as a set of organizations that pools resources or coordinates activities to pursue common and independent goals. Two related
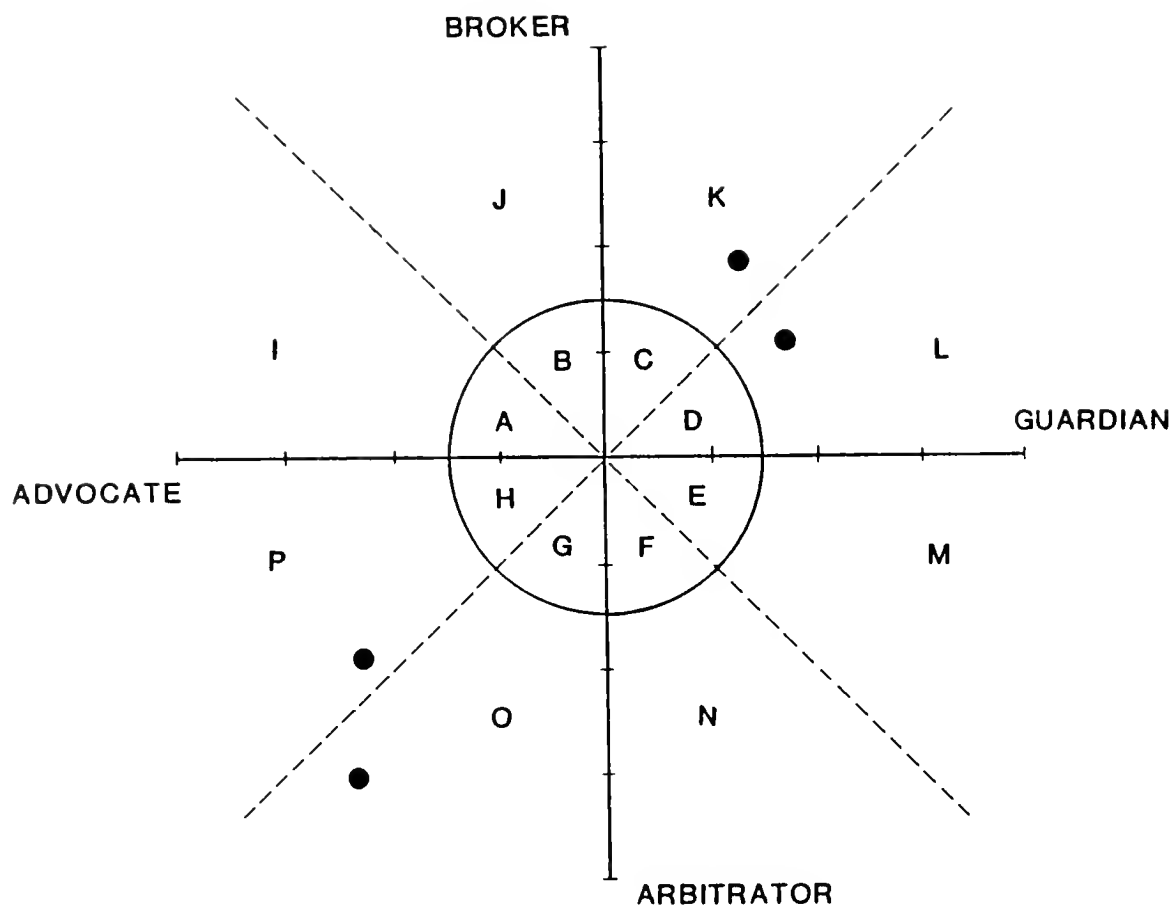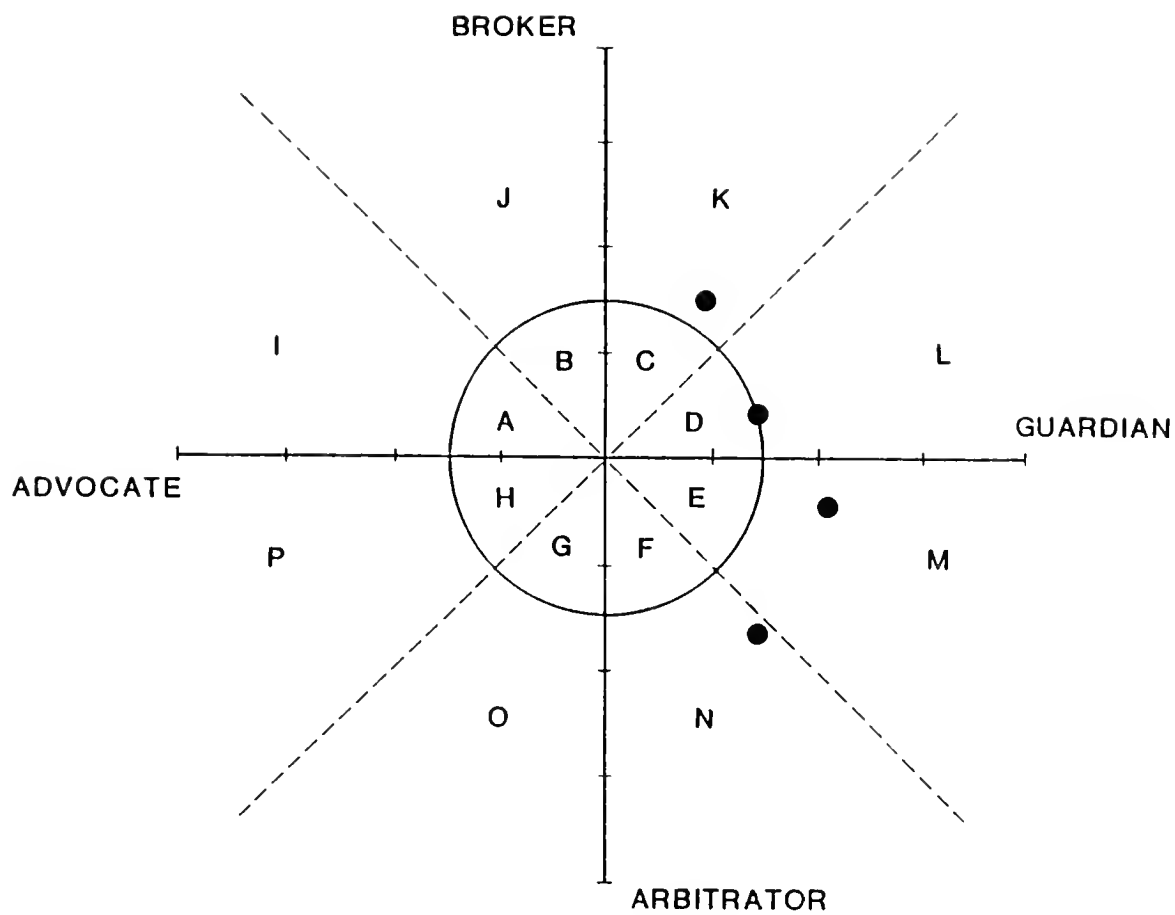
Figure 16. Likely scenario for integrative negotiations: a first cut.
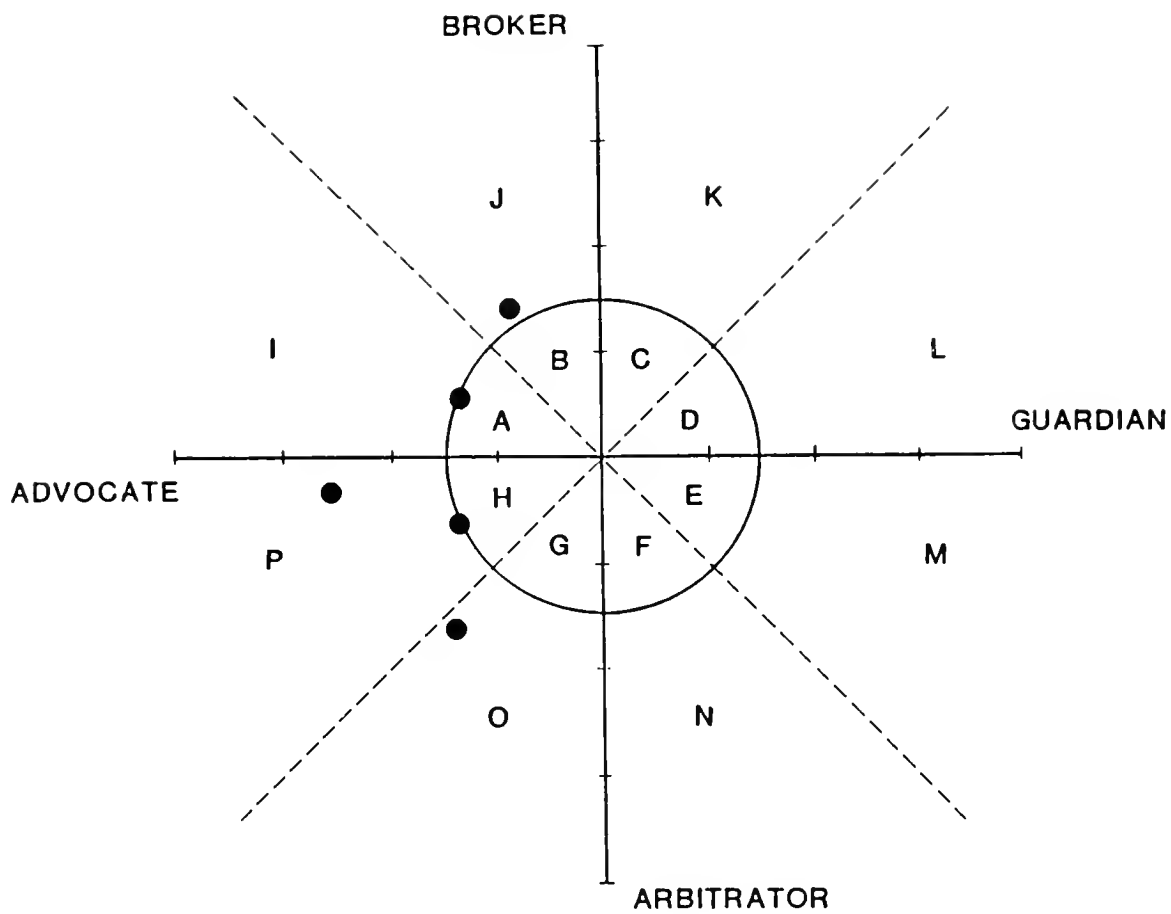
Figure 17. Likely scenario for integrative negotiations: a second cut.

elements of a resource conflict are worth examining with regard to coalitions. The first has to do with the goals that the various organizations hope to achieve in the conflict. The second has to do with power.

Although numerous researchers have attempted to identify the factors that increase the likelihood of coalitions forming, the one that appears to have the most empirical validity--and which also seems most relevant to the types of conflicts addressed here--is Axlerod's notion of "minimal connectedness" (Axlerod 1970; Browne 1973).

Axlerod suggests that coalitions are most likely to form where there is the least amount of conflict of interest among the members. Those organizations having similar values--and goals stemming from those values--have the least amount of conflict of interest among them. Thus, groups (or individuals) tend to coalesce when they are located close to one another along some relevant ideological continuum. This set also tends, however, to be of minimal size; the smaller a successful coalition, after all, the greater is each member's share of the goods obtained and the fewer are the concessions they have to make among themselves (Axlerod 1970). Coalitions do develop that contain numerically unnecessary members. Axlerod indicates that this tends to occur when the unnecessary members are ideologically close to the others. Eavey and Miller (1984) explain in different terms why coalitions arise that contain more members than are absolutely necessary to achieve mutual goals. For these authors, a norm of fairness exists that can move players toward consensus or to include nonessential members in an alliance. It may be helpful to stress this norm where it appears to be operating--or to create it when none exists. Satisfaction with the results is enhanced when all legitimate parties are allowed to participate. This, in turn, increases the likelihood of compliance with the terms of the agreement and decreases the potential for new but related conflicts at a later point in time (Olive and Lamb 1984; Wilds and Lamb 1985). This may be especially true in cooperative and integrative style negotiations, where both fair results and the maintenance of inter-personal and intergroup relationships are highly valued (Gifford 1985). Complementary sources of power also seem to be an important determinant of group inclinations to form or join coalitions (Smith 1985).

Potential coalitions can be identified from an examination of the role map, subquadrant descriptions, and role indices provided by the model. For example, those organizations located in clusters within the same quadrant are likely to have enough in common to at least consider becoming members of the same coalition. The key factor to examine here, however, is the intensity of organizational preference for one type of outcome over another. Thus, all organizations having either "advocate" or "guardian" as their dominant role type are likely to coalesce with organizations of a similar perspective. Indeed, the stronger the preference for one type of outcome over another, the more extreme will be the behavior of the organization in pursuit of that outcome. Extreme ideological players are deeply committed to the values they represent. These organizations are also most likely to expand the conflict or litigate should the outcome not be in their favor. Thus, the analyst needs to examine the number, type, and distribution of extreme advocate and guardian organizations. Strategies should be developed for dealing with a number of possible scenarios. Three questions that should be answered regarding potential coalitions are outlined below.

First, which organizations represent potential coalition partners for one's own organization? These groups need to be identified so that they can begin to communicate among themselves, identify common goals, develop strategies for the pursuit of those goals, and formulate compromises where differences do exist. Those organizations located closest to one's own group on the role map should be examined individually to determine what common interests exist among them. The information contained in the Phase I analyses lists the goals identified by the analysts for the various organizations. The behavioral descriptions associated with each of these organizations can provide additional information in this regard.

Once mutual goals have been identified and categorized, it is important to examine the types of power these groups have to pursue those goals. Groups that have complementary bases of power are not only more likely to join the same coalition to begin with (Smith 1985), but are able to achieve more together than alone, at less overall cost to the coalition as a whole. Another reason it is important to examine the power columns and indices of potential coalitions members is to identify those areas in which the coalition is weak. If, for example, a coalition has adequate funding and personnel, but little public, political, or interest group support, attempts can be made to strengthen the coalition's power in this latter category. Other players may be willing to provide the necessary element of power, in exchange for concessions later in the negotiation process. A campaign could be initiated to increase public awareness and sympathy for the values represented by the coalition, thereby expanding the conflict (Cobb and Elder 1983). Resources from one power source can be converted into another type of power. For example, money can be used to purchase outside expertise or information if the coalition has plenty of the former, and very little of the latter.

Second, what is the probability of an opposing coalition forming among the other participants in the conflict? The most likely candidates are those organizations located in the quadrant opposite the one in which one's own organization is located. These groups should be examined in a similar manner to that outlined above. In spite of the fact that the two sides represent seemingly polarized viewpoints, an attempt should be made to identify areas in which agreement may be reached. Potential tradeoffs can be identified early-on, which could help set the stage for compromise between the two sides of the conflict. More difficult issues can be postponed until later in the negotiation process, after communication has begun between the parties, some degree of trust has been established, and a climate of cooperation engendered. Moderate players, located inside the arcs on the role map, can also be encouraged to work together to pull the more extreme players closer to the middle--and towards compromise.

Third, are there potential coalitions between the organizational participants and their interest group allies? The importance of interest groups in policymaking should not be underestimated (Greenwald 1977; Cummings and Wise 1985; Smith 1985). A careful examination should be made of this element of organizational power to determine not only which interest groups are already allied with various organizational participants in the conflict, but to ascertain the likelihood of currently noninvolved interest groups being pulled into the conflict. Interest groups are likely to be the most politically

powerful players in a conflict. Indeed, one study concluded that the key element in many interest group decisions to coalesce with one another was the degree to which one element of political power complemented another; that is, political power--rather than resources or expertise--was the major element of power interest groups involved in water policy formulation in the Southwest considered in making a decision to coalesce with other interest groups involved in the same policy area (Smith 1985).

Power is the driving force that moves most resource conflicts to resolution. It is the crucial component of organizational ability to either pursue a particular type of outcome or to render a particular kind of decision. Power relationships must be carefully examined throughout the process of analysis and strategy development recommended here. Individual elements of organizational power, however, should also be examined in their own right. Power in instream flow conflicts is postulated to exist in three different categories. For each organization participating in a conflict, the analyst should examine all three categories and attempt to identify the most powerful organizations and likely coalitions in a conflict. When potential brokers or arbitrators appear on the role map, an examination of the statutory and political power they have to decide the outcome is in order; the desire to broker or arbitrate a particular conflict--alone--is not enough. As coalitions form or separate, the types and distribution of power among them should be tracked also. Careful analysis of power will not only provide clues regarding which strategies may prove most effective, but will enable an analyst to identify his own organization's strengths and weaknesses, and provide information about which coalitions to join or avoid. Organizations and coalitions that have a strong and well balanced power structure have a decided advantage in influencing the outcome of a conflict.

Many other coalition scenarios are possible. These are just three examples of the types of concerns that an analyst needs to address. The point here is that both the intensity of preference for a particular type of outcome--typically associated with organizational mission or ideology--and power are important elements of coalition formation decisions. An analyst should examine each carefully. This may be done to develop strategies for forming coalitions of one's own--or for bargaining more successfully with the opposing coalitions that emerge.

6.4 GENERAL STRATEGIES

Bingham (1985) identified several factors that affect success in mediated environmental negotiations. First, the parties must have some incentive to negotiate and reach an agreement. Two such incentives have already been discussed: the desire to maintain positive working relationships and presence of a deadline. Other possibilities include the need to appease public opinion, avoid the cost accompanying delay or litigation, and the desire to avoid uncertainty. If no such incentives are readily identifiable, it may be necessary to define one and make the participants aware of its existence. Use of the media to promote a particular set of values may be helpful in this regard (Cobb and Elder 1983).

Second, negotiators should attempt to identify the real needs and interests that often underlie stated positions (Fisher and Ury 1981; Bingham 1985). This is often more difficult than it sounds, especially in highly competitive negotiations, where the parties tend to take absolute stands and withhold information from one another. Communication is essential for parties desiring to foster cooperative or integrative negotiation settings. The negotiators must often search carefully to identify mutual or complementary interests among the parties, and then communicate a sense of understanding what those needs actually are. Demonstrating a willingness to compromise will also facilitate movement from competitive to noncompetitive bargaining.

Third, it is extremely important to make certain that the organization in charge of implementing the agreement participates in the process, as well as all of the organizations that will be affected by the outcome (Bingham 1985). Participation produces a feeling of commitment among the parties, and commitment, in turn, increases the likelihood of implementation.

Finally, the use of an objective mediator is strongly recommended. Mediators can facilitate communication among the parties to a conflict and help identify needs and avoid impasse (Bingham 1985; Wilds and Lamb 1985). Although an arbitrating organization--such as the Federal Energy Regulatory Commission--may play this role in some conflicts (Olive and Lamb 1984; Wilds and Lamb 1985), it is usually reluctant to do so in most cases. An objective professional is generally more desirable in this role. Mediation is increasingly recommended as a viable method of conflict resolution in environmental disputes (Strauss 1979; Clark and Emrich 1980; Lake 1980; Abrams and Stephen 1986).

6.5 DEFINING SUCCESS

The major criterion for evaluating the success of a negotiation is the quality of the solution produced. Does it reflect the real needs and goals of your own organization, both over the short and long term? Does it reflect the needs of the other parties? Have the parties explored all possibilities--and attempted to generate a win-win solution, in which all parties are satisfied? Was the solution achieved at the lowest possible costs compared to the desirability of the outcome? Is it achievable? Are those who participated satisfied with the process used to generate the outcome? And finally, is the solution fair or just? By satisfying these criteria, a negotiation may produce results that are acceptable to all concerned, which, in turn, should lead to a greater sense of commitment to the agreement (Menkel-Meadows 1984).

The Legal-Institutional Analysis model can help individuals and groups involved in instream flow disputes to move toward an agreement that meets these criteria. This is because it enables users to develop an understanding of the environment in which the conflict will occur, and of the organizations that are to participate. The needs and interests of the parties can thus be identified and predictions about organizational behavior and interaction made. Strategies and tactics are then selected based on this information; potential problems can be identified before they become an entrenched part of the negotiation process, and communication enhanced among the participants.

REFERENCES

Abrams, N., and B. R. Stephen. 1986. Mediation: a better alternative to science courts. Bull. Atomic Sci. 3(4):50-53.

Aiken, J. 1983. Opportunities to protect instream flows in Minnesota and Iowa. U.S. Fish Wildl Serv. FWS/OBS-83/07. NTIS (PB 83 239467). 64 pp.

Allison, G. T. 1969. Conceptual models of the Cuban Missile Crisis. Amer. Polit. Sci. Rev. 63(3):689-718.

_____. 1971. Essence of decision: explaining the Cuban missile crisis. Little, Brown and Co., Boston, MA. 338 pp.

Allison, G. T., and M. H. Halperin. 1971. Bureaucratic politics: a paradigm and some policy implications. World Politics Special Issue XXIV:40-79.

Alston, R. M. 1983. The individual vs. the public interest: political ideology and national forest policy. Westview Press, Boulder, CO. 250 pp.

Anderson, F. R. 1973. NEPA in the courts: a legal analysis of the National Environmental Policy Act. Johns Hopkins University Press, Baltimore, MD. 339 pp.

Anderson, T. 1983. Water crisis: ending the policy drought. Johns Hopkins University Press, Baltimore, MD. 121 pp.

Anderson, T. L., ed. 1983. Water rights: scarce resource allocation, bureaucracy, and the environment. Pacific Institute for Public Policy Research, San Francisco, CA. 330 pp.

Axelrod, R. W. 1970. Conflict of interest: a theory of divergent goals with applications to politics. Markham Press, Chicago, IL. 216 pp.

Bachrach, S. B., and E. J. Lawler. 1981. Bargaining: power, tactics and outcome. Jossey-Bass Publishers, San Franciso, CA. 234 pp.

Barbour, J. 1986. Municipal water supply problems in the Southwest: leadership at what level? Paper presented to the 1986 annual meeting of the Southwestern Political Science Association, San Antonio, TX. 23 pp.

Beckett, P. L., and B. L. Lamb. 1976. Establishing instream flows: analysis of the policymaking process in the Pacific Northwest. Final Tech. Rep., Proj. A-077-WASH, OWRT Agreement No. 14-34-0001-6050. 76 pp.

Behn, R. D. 1981. Policy analysis and policy politics. Policy Anal. 7(2): 199-226.

Benveniste, G. 1977. The politics of expertise. Boyd and Fraiser Publishing Co., San Francisco, CA. 232 pp.

Bingham, G. 1985. Executive summary--resolving environmental disputes: a decade of experience. Conservation Foundation, Washington, DC. 10 pp.

Bovee, K. D. 1982. A guide to stream habitat analysis using the Instream Flow Incremental Methodology. Instream Flow Information Paper No. 12. U.S. Fish Wildl. Serv. FWS/OBS-82/26. 248 pp.

Brandes, K. 1985. Opportunities to protect instream flows in Idaho, Oregon and Washington. U.S. Fish Wildl. Serv. Biol. Rep. 85(9). 126 pp.

Braybrooke, D., and C. E. Lindblom. 1963. A strategy of decision: policy evaluation as a social process. The Free Press, NY. 268 pp.

Brown, M. 1980. Laying waste: the poisoning of American by toxic wastes. Pantheon Books, NY. 384 pp.

Browne, E. C. 1973. Coalition theories: a logical and empirical critique. Sage Publications, Beverley Hills, CA. 95 pp.

Callaham, R. Z. 1984. Managing for applications, not just research and development. J. Forestry, April:224-26.

Cialdini, R. B. 1984. Influence: how and why people agree to things. William Morrow and Co., Inc., New York. 302 pp.

Clark, P. B., and W. M. Emrich. 1980. New tools for resolving environmental disputes. Institute for Environmental Negotiation, Charlottesville, VA. 20 pp.

Clarke, J. N., and D. McCool. 1985. Staking out the terrain: power differentials among natural resource agencies. State University of New York Press, NY. 189 pp.

Clyde, S. E. 1985. Trading 404 permits for enhanced habitat. Nat. Resour. Environ. 1(1):37-41.

Cobb, R. W., and C. D. Elder. 1983. Participation in American politics: the dynamics of agenda-building, 2nd ed. Johns Hopkins University Press, Baltimore, MD. 224 pp.

Cohen, A. R., et al. 1963. Commitment to social deprivation and verbal conditioning. J. Abnormal Soc. Psych. C7:410-21.

Cohen, H. 1980. You can negotiate anything. Bantam Books, NY. 255 pp.

Cortner, H. J., and F. L. Marsh. 1986. Institutional analysis in community decisionmaking: a case example from Southern Arizona. Paper presented to the Western Social Science Assoc. 28th annual conf, Reno, NV. 26 pp.

Cummings, M. C., and D. Wise. 1985. Democracy under pressure: an introduction to the American political system, 5th ed. Harcourt, NY. 689 pp.

Cunningham, F. M. 1973. The appraisal of riparian rights. Appraisal J., April:180-200.

Cyert, R. M., and J. G. Marsh. 1963. A behavioral theory of the firm. Prentice-Hall, Inc., Englewood Cliffs, NJ. 332 pp.

Dahl, R., and C. Lindblom. 1953. Politics, economics and welfare. Harper and Bros., NY. 557 pp.

Daneke, G. A., and J. D. Priscoli. 1979. Social assessment and resource policy: lessons from water planning. Nat. Resour. J. 19:359-75.

Davis, P. 1982. The riparian right of streamflow protection in the Eastern States. Arkansas Law Rev. 36:47-80.

Dewsnup, R. L., and D. W. Jensen. 1977a. Strategies for reserving flows for fish and wildlife: identification, description and preliminary evaluation. U.S. Fish Wildl. Serv. FWS/OBS-77/26. 706 pp.

_____. 1977b. State laws and instream flows. U.S. Fish Wildl. Serv. FWS/OBS-77/27. 76 pp.

Doerksen, H., and B. L. Lamb. 1974. Instream flow: an emerging arena of conflict. Paper presented to the 10th annual conf. of the American Water Resources Assoc. Las Croabos, PR. 16 pp.

_____. 1979. Managing the rippling stream: a model of decisionmaking in natural resouces administration. Water Resour. Bull. 15(6):1-9.

Downs, A. 1965. Some thoughts on giving people economic advice. Econ. Today IX(1):30-32.

Eavey, C. L., and G. J. Miller. 1984. Fairness in majority rule games with a core. Amer. J. Polit. Sci. 28(3):570-86.

Ehrlich, T. 1983. Opportunities to protect instream flows in Georgia. U.S. Fish Wildl. Serv. FWS/OBS-83/20. 28 pp.

Ertl, D. 1985. Opportunities to protect instream flows in Maine. U.S. Fish Wildl. Serv. FWS/OBS-85/10. 44 pp.

Fenno, R. 1966. The power of the purse: appropriation politics in Congress. Little, Brown and Co., Boston, MA. 704 pp.

Fenno, R. F., Jr. 1970. The initiation rites of the House Appropriations Committee. Pages 150-165 in J. H. Kessel, G. F. Cole, and R. Seddig, eds. Micropolitics: individual and group level concepts. Holt, Rinehart, and Winston, NY.

Festinger, L. 1957. A theory of cognitive dissonance. Stanford University Press, Stanford, CA. 291 pp.

Festinger, L., ed. 1964. Conflict decision and dissonance. Stanford University Press, Stanford, CA. 163 pp.

Fisher, R., and W. Ury. 1981. Getting to yes: negotiating agreement without giving in. Houghton Mifflin Co., Boston, MA. 163 pp.

Frederick, K. D. 1982. Water supplies. Pages 216-252 in P. R. Portney, ed. Current issues in natural resources policy. Resources for the Future, Washington, DC. 300 pp.

Gifford, D. G. 1985. A context based theory of strategy selection in legal negotiations. Ohio State Law J. 46(1):42-94.

Goleman, D. 1985. Science of business: following the leader. Science Oct:18-20.

Golembiewski, R. T. 1976. Perspectives on public management: cases and learning designs, 2nd ed. F. E. Peacock Publishers, Itasco, IL. 263 pp.

Gould, G. A. 1977. Preserving instream flows under the appropriation doctrine: problems and possibilities. In B. L. Lamb, ed. Protecting instream flows under Western water laws: selected papers. Instream Flow Information Paper No. 2. U.S. Fish Wildl. Serv. FWS/OBS-77/47. 65 pp.

Greenwald, C. S. 1977. Group power: lobbying and public policy. Praeger Publishers, NY. 372 pp.

Haimes, Y. 1984. Educating water resources engineers: the need to add a political-legal-social dimension. Paper presented at the Annual American Society of Civil Engineers Conf., Baltimore, MD. 9 pp.

Harter, P. J., and G. C. Eads. 1985. Policy instruments, institutions and objectives: an analytical framework for assessing alternatives to regulation. Admin. Law Rev. 37(3):222-58.

Hipel, K. W., R. K. Ragade, and T. E. Unny. 1976. Political resolution of environmental conflicts. Water Resour. Bull. 12(4):813-27.

Hoffman, S. 1968. The state of war: essays on the theory and practice of international politics. Praeger Publishers, NY. 276 pp.

Hrebenar, R. J. 1976. The utility of role in budgetary decisionmaking. Western Polit. Q. 29(4):575-88.

Huffman, J. 1983. Instream water use: public and private alternatives. Pages 249-282 in T. L. Anderson, ed. Water rights: scarce resource allocation, bureaucracy, and the environment. Ballinger Publishing, Co., Cambridge, MA.

Ingram, H. 1972. The changing rules in the politics of water development. Water Resour. Bull. 8(6):1177-88.

Ingram, H. 1973. Information channels and environmental decisionmaking. Nat. Resour. J. 13(1):150-69.

Ingram, H. M., and D. E. Mann. 1984. Preserving the Clean Water Act: the appearance of environmental victory. Pages 251-272 in N. J. Vig and M. E. Kraft, eds. Environmental policy in the 1980s: Reagan's new agenda. Congressional Quarterly Press, Washington, DC.

Ingram, H. M., D. E. Mann, G. D. Weatherford, and H. J. Cortner. 1984. Guidelines for improved institutional analysis in water resource planning. Water Resour. Res. 20(3)323-34.

Janis, I. L. 1972. Victims of groupthink: a psychological study of foreign policy decisions and fiascoes. Houghton-Mifflin Co., Boston, MA. 276 pp.

Janis, I. L., and L. Mann. 1979. Decisionmaking: a psychological analysis of conflict, choice and commitment, 2nd ed. Free Press, NY. 488 pp.

Kasperson, R. E. 1969. Political behavior and the decisionmaking process in the allocation of water resources between recreational and municipal uses. Nat. Resour. J. 9:176-211.

Kornberg, A. 1970. Rules of the game in the Canadian House of Commons. Pages 242-65 in J. H. Kessell, G. F. Cole, and R. Seddig, eds. Micro-politics: individual and group level concepts. Holt, Rinehart, and Winston, NY. 643 pp.

Lake, L. M., ed. 1980. Environmental mediation: the search for consensus. Westview Press, Boulder, CO. 233 pp.

Lamb, B. L. 1984a. Policy implementation: correcting misconceptions about environmental regulation. Boston College Environ. Affairs Law Rev. 11(4):901-9.

_____. 1984b. Meeting the challenge of policy-relevant science: lessons from Northern water resources projects. Paper presented to the AAAS annual Conf., Arctic Division. 15 pp.

_____. 1980a. Agency behavior in the management of Section 208. Pages 209-218 in B. L. Lamb, ed. Water quality administration: a focus on Section 208. Ann Arbor Science Publishers, Inc., Ann Arbor, MI. 9 pp.

_____. 1980b. General opportunities for protecting instream uses in Western States. Speech presented at the AWRBIA semi-annual meeting. Santa Fe, NM. 5 pp.

Lamb, B. L., and H. Doerksen. 1978. Bureaucratic power and instream flows. J. Polit. Sci. VI(1):35-50.

Lamb, B. L., and N. P. Lovrich. 1986. Consideration of strategy and use of technical information in building an urban instream flow program. J. Resour. Plan. Manage. 1986:1-22.

Lamb, B. L., and H. Meshorer. 1983. Comparison of instream flow programs: a report on the current status. Pages 1-17 in Proceedings of the conference on advances in irrigation and drainage: surviving external pressures. A special conference of the American Society of Civil Engineers, Irrigation and Drainage Division, Jackson, WY.

Lasswell, H. D. 1936. Politics: who gets what, when, and how. McGraw Hill Publishers, NY. 264 pp.

Lee, K. N. 1982. Defining success in environmental dispute resolution. Resolve Spring:1-6.

Lester, J. P., and A. O. Bowman, eds. 1983. The politics of hazardous waste management. Duke University Press, Durham, NC. 318 pp.

Lindblom, C. E. 1959. The science of muddling through. Public Admin. Rev. XIX(2):79-88.

Lindblom, C. E. 1965. The intelligence of democracy: decisionmaking through mutual adjustment. Free Press, NY. 352 pp.

Lindblom, C. E. 1968. The policymaking process. Prentice-Hall, Inc., Englewood Cliffs, NJ. 122 pp.

Linstone, H. A., and M. Turoff. 1975. The Delphi method: techniques and applications. Addison-Wesley, Reading, MA. 620 pp.

Lipset, S. M., and M. Schwartz. 1966. The politics of professionals. In H. J. Vollner and D. L. Mills, eds. Professionalization. Prentice Hall, NJ. 365 pp.

Long, N. E. 1949. Power and administration. Public Admin. Rev. IX(4):257-64.

Lord, W. B. 1984. Institutions and technology: keys to better water management. Water Resour. Bull. 20(5):651-56.

Lowenthal, G. T. 1982. A general theory of negotiation process, strategy and behavior. Arkansas Law Rev. 31:69-114.

Lowi, T. J. 1972. Four systems of policy, politics, and choice. Public Admin. Rev. 32:298-310.

Lowi, T. J. 1969. The end of liberalism: ideology, policy, and the crisis in public authority. W. W. Norton Co., NY. 322 pp.

Mann, D. E. 1982a. Environmental policy implementation: planning and management options and their consequences. D. C. Heath and Co., Lexington, MA. 261 pp.

Mann, D. E. 1982b. Institutional framework for agricultural water conservation and reallocation in the West: a policy analysis. Pages 9-52 in G. D. Weatherford, L. Brown, H. Ingram, and D. Mann, eds. Water and agriculture in the Western U.S.: conservation, reallocation and markets. West View Press, Boulder, CO. 269 pp.

Menkel-Meadows, C. 1984. Toward another view of legal negotiation: the structure of problem-solving. UCLA Law Rev. 31:754-842.

Meyers, C. J., and A. D. Tarlock. 1980. Water resource management: a coursebook in law and public policy, 2nd ed. Foundation Press, Mineola, NY. 223 pp.

Minton, G., et al. 1980. Institutional analysis criteria for water supply planning. Water Resour. Bull. 16(3):486-93.

Mosher, F. C., and J. E. Harr. 1970. Programming systems and foreign affairs leadership: an attempted innovation. Oxford University Press, NY. 261 pp.

Mulford, C. L., and D. L. Rogers. 1982. Definitions and models. Pages 9-31 in D.L. Rogers and D.A. Whitten, eds. Interorganizational coordination: theory, research and implementation. Iowa State University Press, Des Moines.

Mumme, S. P., and H. M. Ingram. 1984. Empowerment and the Papago Tribe: water politics in Southern Arizona. Paper presented to the annual meeting of the American Political Science Assoc., Washington, DC. 37 pp.

Neustadt, R. 1980. Presidential power: the politics of leadership, from FDR to Carter, 3rd ed. John Wiley and Sons, NY. 286 pp.

Nierenberg, G. 1977. Fundamentals of negotiating. Hawthorne Books, Inc., NY. 328 pp.

Olive, S. W. 1981a. Protecting instream flows in California: an administrative case study. U.S. Fish Wildl. Serv. FWS/OBS-82/34. 32 pp.

_____. 1981b. Protecting instream flows in Idaho: an administrative case study. U.S. Fish Wildl. Serv. FWS/OBS-82/35. 30 pp.

_____. 1982. Decisionmaking in natural resources. Paper presented to the conference of water and energy, Ft. Collins, CO. 5 pp.

Ripley, R. B., and G. A. Franklin. 1984. Congress, the bureaucracy and public policy, 3rd ed. The Dorsey Press, Homewood, IL. 282 pp.

Rogers, D. L., and D. A. Whitten, eds. 1982. Interorganizational coordination: theory, research, and implementation. Iowa State University Press, Des Moines. 206 pp.

Rosenbaum, W. A. 1985. Environmental politics and policy. Congressional Quarterly Press, Washington, DC. 328 pp.

Rosenthal, R. A., and R. S. Weiss. 1966. Problems of organizational feedback processes. Pages 302-40 in R. A. Bauer, ed. Social indicators. MIT Press, Cambridge, MA. 357 pp.

Rothman, J. 1980. Using research in organizations: a guide to successful application. Sage Library of Social Research, Beverley Hills, CA. 229 pp.

Rourke, F. E. 1976. Bureaucracy, politics, and public policy, 2nd ed. Little, Brown and Co., Boston, MA. 208 pp.

Sayre, W. S., and H. Kaufman. 1970. The diffusion of policy in New York City. Pages 610-625 in J. H. Kessel, G. F. Cole, and R. F. Sedding, eds. Micropolitics: individual and group level concepts. Holt, Rinehart and Winston, NY. 643 pp.

Schattschneider, E. E. 1960. The semi-sovereign people: a realist's view of democracy in America. Holt, Rinehart, and Winston, NY. 147 pp.

Scheele, D. S. 1975. Reality construction as a product of Delphi interaction. Pages 37-71 in H. A. Linstone and M. Turoff, eds. The Delphi method: techniques and applications. Addison-Wesley, Reading, MA. 620 pp.

Schlesinger, J. R. 1968. Systems analysis and the political process. J. Law Econ. 11:281-298.

Seidman, H. 1970. Politics, position, and power: the dynamics of federal organization. Oxford University Press, NY. 311 pp.

Sharkansky, I. 1970. The routines of politics. Van Nostrand Reinhold Co., NY. 192 pp.

Simon, H. 1957a. Administrative behavior: a study of decisionmaking processes in administrative organization, 2nd ed. McMillan, NY. 259 pp.

_____. 1957b. Models of man. Wiley, NY. 287 pp.

_____. 1964. On the concept of organizational goal. Admin. Sci. Q. 9:1-22.

Smith Z. A. 1985. Interest group interaction and groundwater policy formation in the Southwest. University of America Press, MD.

Strauss, D. B. 1979. Managing environmental complexity: a new look at environmental mediation. Environ. Sci. Tech. 13(6):661-665.

Tarlock, A. D. 1978. Appropriation for instream flow maintenance: a progress report on "new" public Western water rights. Utah Law Rev. 2:211-247.

Twight, B. W., and W. R. Catton, Jr. 1975. The politics of images: forest managers vs. recreation publics. Nat. Resour. J. 15:297-306.

Weatherford, G. D. 1982. Thematic overview of the conserve-and-transfer strategy of water management. Pages 1-8 in G. D. Weatherford, L. Brown, H. Ingram, and D. Mann, eds. Water and agriculture in the Western U.S.: conservation, reallocation, and markets. Westview Press, Boulder, CO.

White, G. F. 1971. Strategies of American water management. University of Michigan Press, Ann Arbor. 155 pp.

White, J. D. 1986. On the growth of knowledge in public administration. Public Admin. Rev. Jan/Feb:15-24.

White, M. R., et al. 1980. Instream flow negotiation: review of practices. U.S. Fish Wildl. Serv. FWS/OBS-80/50. 69 pp.

Wieck, K. E. 1964. Reduction of cognitive dissonance through task enhancement and effort expenditure. J. Abnormal Soc. Psych. 68:533-39.

Wildavsky, A. 1974. The politics of the budgetary process, 2nd ed. Little, Brown, and Co., Boston, MA. 271 pp.

_____. 1975. Budgeting: a comparative theory of budgetary processes. Little, Brown and Co., Boston, MA. 432 pp.

_____. 1979. Speaking truth to power: the art and craft of policy analysis. Little, Brown, and Co., Boston, MA. 431 pp.

Wilds, L. J. 1985. A negotiators checklist: success through preparation. Hydro Rev. IV(4):56-65.

Wilds, L. J., and B. L. Lamb. 1985. Conflict resolution and negotiation in the licensing process. Pages 444-450 in Proceedings of the Symposium on Small Hydro and Fisheries. American Fisheries Society, Bethesda, MD.

Yaffe, S. L. 1982. Prohibitive policy: implementing the Federal Endangered Species Act. MIT Press, Cambridge, MA. 239 pp.

Yarwood, D. L., and D. D. Nimmo. 1976. Subjective environments of bureaucracies: accuracies and inaccuracies in role-taking among administrators, legislators and citizens. Western Polit. Q. 29(3):337-52.

Zuboy, J. R. 1981. A new tool for fisheries managers: the Delphi technique. N. Amer. J. Fish. Manage. 1:55-59.

APPENDIX I

LIAM SUBQUADRANT DESCRIPTIONS

A: MODERATE ADVOCATE-BROKER:

Is protective of environmental and noneconomic values, and will join forces with others to resist proposals or projects that threaten those values. Will cooperate in efforts to change the ways in which resources have been used and managed in the past, and will contribute to crusading efforts initiated by others on behalf of the environment. Will use scientific and technical data to support its position. Prefers a negotiated outcome in which decisions are a result of bargaining among players. Thus, it will not resist efforts to keep or push the conflict into the distributive arena. Will be somewhat open to compromise.

B: MODERATE BROKER-ADVOCATE:

Will cooperate in efforts to keep or push the decision into the distributive arena, where the outcome is a negotiated or brokered one. Will not resist efforts to change the traditional ways in which resources have been used and managed in the past, but will prefer to build a political coalition to bring about such changes and to protect environmental and nontraditional values. Thus, will use technical and scientific data in combination with political and economic information to support its position. Will avoid taking absolute positions in bargaining situations and will readily compromise.

C: MODERATE BROKER-GUARDIAN:

Will cooperate in efforts to keep or push the decision into the distributive arena, where the outcome is a negotiated or brokered one. Will not resist efforts to prevent change in the traditional use and management of resources, but will prefer to build a political coalition to stop such changes and to protect economic and developmental values. Thus, will use economic, political, and constituency information to support its position. Will avoid taking absolute positions in bargaining situations and will readily compromise.

D: MODERATE GUARDIAN-BROKER:

Will cooperate in efforts to prevent change in the traditional use and management of resources, but prefers to join a political coalition to resist change and protect its own economic and constituency interests. Thus, will use economic (such as cost-benefit analyses) and constituency information to support its position. Will not resist efforts to keep or push the conflict into the distributive arena, where the outcome is a negotiated or brokered one. Will avoid taking positional stands in bargaining situations and is somewhat open to compromise.

E: MODERATE GUARDIAN-ARBITRATOR:

Will cooperate in efforts to prevent change in the traditional use and mangement of resources, and will contribute to campaigns seeking to protect economic and constituency values. Prefers, however, to operate in the regulatory arena, where decisions are objectively made by an arbitrating organization based on evidence presented by all sides to the dispute. Thus prefers and will use scientific and technical data to support its position. Will tend to be somewhat demanding in bargaining situations and not be very open to compromise.

F: MODERATE ARBITRATOR-GUARDIAN:

Will cooperate in efforts to keep or push the conflict into the regulatory arena, where decisions are objectively made by an arbitrating organization based on evidence presented by all sides to the dispute. Prefers and will use economic information (such as cost-benefit analyses) to support its position. Will not resist efforts to prevent change in the traditional use and management of resources, and will not resist campaigns initiated by others on behalf of economic and constituency values. Will take positional stands in bargaining situations, however, and will not be very open to compromise.

G: MODERATE ARBITRATOR-ADVOCATE:

Will cooperate in efforts to keep or push the decision into the regulatory arena, where decisions are made by an arbitrating organization based on evidence presented by all sides to the dispute. Prefers and will use technical and scientific data to support its position. Will not resist efforts to initiate changes in the ways in which resources have been used and managed in the past, and will not resist campaigns to protect environmental values. Will tend to be somewhat demanding in bargaining situations and not be very open to compromise.

H: MODERATE ADVOCATE-ARBITRATOR:

Will cooperate in efforts to protect environmental and nontraditional values, and will contribute to campaigns to protect such values and to initiate changes in the ways in which resources have been traditionally used and managed in the past. Will not resist efforts to keep or push the conflict into the regulatory arena, where decisions are made by an arbitrating organization authorized to make the decision based on evidence presented by all sides to the dispute. Prefers and will use scientific and technical data to document its position. Will be somewhat demanding in bargaining situations and will not be very open to compromise.

I: EXTREME ADVOCATE-BROKER:

Will frequently speak out--in the media, at public meetings and the like--on behalf of environmental values, and will strongly push for changes in the traditional ways in which resources have been managed and used in the past. Will employ crusading techniques to protect the environment from the crises it feels are approaching, and will actively solicit support from other groups in these values, however, will argue for compromise, and willingly participate in negotiation. Will cooperate in efforts to keep or push the conflict into the distributive arena, where decisions are the result of bargaining. Is likely to have a close relationship with the potential broker in a conflict. Exhibits a strong belief in the correctness of its world view. Is apt to utilize political and economic information and to take absolute positions in bargaining situations.

J: EXTREME BROKER-ADVOCATE:

Will actively seek support for a negotiated solution, which is the result of bargaining and compromise, and will lead attempts to keep or push the conflict into the distributive arena. Is likely to be in the position to actually broker the decision itself, because it tends to have physical or legal control over the resources in question. Will solicit support from the general public and controlling politicians for its position, and will actively seek to build a political coalition on behalf of environmental values and to initiate changes in the ways in which resources have been traditionally used and managed. Jealous of its brokering role, this organization will attempt to integrate the parties and positions in bargaining situations. Will be keenly interested in all types of information in a dispute, but will prefer information that demonstrates the benefits to be derived for all parties from changes proposed by advocates or recommendations that protect the environment. Will avoid taking positional stands and will be open to compromise, at least where some means for resource protection or regulation is included in the outcome.

K: EXTREME BROKER-GUARDIAN:

Will actively seek support for a negotiated solution, which is the result
of bargaining and compromise, and will lead attempts to keep or push the
conflict into the distributive arena. Is likely to be in the position to
broker the decision itself, because it will tend to have physical or
legal control over the resources in question. Will solicit public,
political, and constituency support for its position, and will actively
seek to build a political coalition to resist changes in the ways in
which resources have been traditionally used and managed in the past, and
to protect its own economic interests and those of its substantial
constituency. Will be jealous of its brokering role and thus will attempt
to integrate the parties and positions in bargaining situations. Will be
interested in all types of information in a dispute, but prefers informa-
tion that is of an economic or political nature. Will avoid taking
absolute positions and will actively promote compromise in bargaining
situations.

L: EXTREME GUARDIAN-BROKER:

Will actively promote its own economic interests and the interests of
its substantial constituency, which it is obligated to protect. Thus, it
will strongly resist proposed changes in the ways in which resources have
been used and managed in the past, especially when these changes threaten
those interests. Strongly believes in a world view that promotes
"economic progress" over "environmental values" and will actively crusade
to have those values protected in the decision outcome. Will seek to put
together a political coalition on behalf of those values and cooperate in
efforts to keep or push the conflict into the distributive arena. Is
likely to have a close relationship with the potential broker, and will
use economic and political data to influence the outcome. Will take
absolute positions in bargaining situations, but will be willing to
compromise, at least where some of its economic interests and those of
its constituency are protected.

M: EXTREME GUARDIAN-ARBITRATOR:

Will actively promote its own economic interests and that of its
substantial constituency, which it feels obligated to protect. Thus,
will strongly resist changes that threaten those interests. Strongly
believes in a world view that promotes "economic progress" over "environ-
mental values" and will use economic and constituency information to
support its position. Will actively crusade on behalf of its world view.
Will cooperate in efforts to keep or push the conflict into the regulatory
arena, however, where decisions are made by an arbitrating organization
based on evidence presented by all sides to the dispute. Will take
absolute positions in bargaining situations and not be open to compromise.

N: EXTREME ARBITRATOR-GUARDIAN:

Will actively seek support to keep or push the conflict into the
regulatory arena, where the decision is made by an arbitrating
organization based on evidence presented by all sides to the dispute. Is
likely to be in a position to arbitrate the decision itself. Will thus
solicit information from all sides of the dispute, and will be more
interested in technical and scientific information than political facts,
especially when these data support its own economic interests and those
of its constituency. Will resist attempted changes in the traditional
ways in which resources have been used and managed in the past, and will
not obstruct crusading campaigns that promote "economic progress" over
"environmental protection." Will take strong positional stands in
bargaining situations and not be open to compromise. May threaten
litigation or actually "try" the case.

O: EXTREME ARBITRATOR-ADVOCATE:

Will actively seek support to keep or push the conflict into the
regulatory arena, where the decision is made by an arbitrating organiza-
tion based on evidence presented by all sides to the dispute. Is likely
to be in a position to arbitrate the decision itself. Will thus solicit
information from all sides of the dispute, and will be more interested in
technical and scientific information than political facts, especially
when these data support environmental protection efforts. Will attempt
to change the traditional ways in which resources have been used and
managed in the past, and cooperate in crusading campaigns promote
"environmental protection" over "economic progress." Will take strong
positional stands in bargaining situations and not be open to compromise.
May threaten litigation or actually "try" the case.

P: EXTREME ADVOCATE-ARBITRATOR:

Will frequently speak out--in the media, at public meetings and the
like--on behalf of environmental values and will lead efforts to change
the traditional ways in which resources have been used and managed in the
past. Will employ crusading techniques to protect the environment from
the crises it feels are approaching, and generate and use scientific and
technical data to support its position. Strongly believes in the correct-
ness of its environmentally protective world view, and will join efforts
to keep or push the conflict into the regulatory arena, where the decision
is made by an arbitrating organization based on evidence presented by all
sides to the dispute. Will take absolute positions in bargaining
situations and not be open to compromise.

APPENDIX II

USER'S MANUAL FOR THE LEGAL-INSTITUTIONAL
ANALYSIS MODEL (LIAM)

USER'S MANUAL FOR THE
LEGAL INSTITUTIONAL ANALYSIS MODEL (LIAM)

by

Nancy Young
Instream Flow Group
Western Energy and Land Use Team
U.S. Fish and Wildlife Service
Drake Creekside Building One
2627 Redwing Road
Fort Collins, CO 80526-2899

This report should be cited as:

Young, N. 1985. User's manual for the Legal Institutional Analysis Model
     (LIAM). U.S. Fish Wildl. Serv. WELUT-86/W04. 48 pp.

CONTENTS

ACKNOWLEDGMENTS

INTRODUCTION

This manual is an antianxiety primer and companion to the Legal Institutional Analysis Model (LIAM). This model is a process designed for agencies and organizations involved in assessing the impacts of water resource projects. It is used for the systematic analysis of those qualities that enable an agency to achieve its goals in a project negotiation. Using LIAM, you will be better equipped to develop the most appropriate strategies for goal achievement, conflict resolution, and effective negotiation.

The major thesis of LIAM is that the political and institutional dynamics that operate in any decision-making process are as vital to the outcome as the technical data and regulations involved. In fact, the institutional dynamics often condition the technical studies. LIAM provides a systematic and routine means to diagnose institutional dynamics before launching a technical study.

In the computer language of our day, computers are referred to as either "user friendly" or "user scary." This manual attempts to set your mind at ease as you try working with a friendly computer program to analyze the water resource conflict you have in mind.

If you are totally new to this system, and computers in general, you might benefit from a bit of advice. Take your time to read over this manual. Pay particular attention to the "Troubleshooting" section. Refer to the -MENU as often as you need for explanations of each program offering. It can be difficult to be patient with a machine, but try to be calm; remember, you will not ruin the programs or hurt future generations by experimenting and practicing different commands. Think of the computer as your silent partner who can add a new perspective to your information and intuitions and contribute creative and helpful alternatives to your own decision-making process.

If you are an advanced computer user, the following description of LIAM might be the basis of your conceptual understanding. The LIAM programs are run by procedures that access various programs, data files, and test files. The source code for the programs is written in Fortran IV. Binary versions of the program are stored in a multirecord file, where they are retrieved by the procedure for execution. Data files are created and named by the user, and are updated each time -QUERY,, or -LOOKY,, is run. Text files include one file containing all of the questions, and other files that contain large textural blocks for use in the -MENU and for user instructions. As the programs are run, subroutines are used extensively. All subroutines are stored in a binary library, which is loaded before the program executes. Many of these subroutines are used in more than one program (e.g., reviewing respondents in a data set is executed by the same subroutine in each program).

1

Each program is written to be user friendly. Where possible, the programs have been written so that errant answers will not cause a program failure.

A WORD ABOUT THE SOFTWARE

LIAM is a collection of programs that observe, articulate, and quantify different positions taken during the course of decision-making. Each program is involved with one of the following steps.

BASIC INFORMATION

DATA GATHERING

DATA DISPLAY

DATA INTERPRETATION AND ANALYSIS

DATA REARRANGEMENT, REVISION, AND REVIEW

LIAM helps you to analyze the present positions of all participants in the decision-making process, and to learn to anticipate potential points of conflict and agreement. No prior experience with computers or keyboards is required. No procedural language must be learned before getting started. Once a LIAM program is chosen, you will interact with the computer program to chart your own course toward a particular decision-making goal. LIAM uses the computer to quantify and graph different positions held by the various decision-making organizations.

You will be asked a series of questions that help define the specific roles, relative powers, information needs, and bargaining potentials of the relevant agencies in the decision-making process. LIAM will then help you to predict your organization's concerns and the likely concerns of others in a specific negotiation--based on the information in your questionnaire file--so that strategic assessments and choices can be prepared before the negotiations begin.

A WORD ABOUT THE HARDWARE

The Computer System

The Cyber Series computers are produced by Control Data Corporation. Two of the Cyber Series computers at Colorado State University (CSU) are referred to as the Green System and the Gold System. You will always be operating in the Gold System.

These computers are hooked up to another computer called MODCOMP II Communications Processor, which has 512 communication lines into the computer center. Another aspect of the Cyber Operating System, commonly called the Network Operating System (NOS) controls the functions of the computer itself. When you are using the Cyber, information concerning the NOS is available; just type "help" and press the carriage return key (noted throughout this

manual as [CR]) while in batch mode (see Glossary). New users especially will want to use the double space before and after "help".

A few items are essential to your working with the computer and LIAM: (1) a terminal (the tv screen with typewriter keys); (2) a modem (the small box that is your telephone link to the Cyber); (3) a printer, if you want hard copies (i.e., paper copies of your results); and (4) a telephone.

Before you begin, you should be aware of one simple mistake that can really slow you down: a computer, unlike children and dandelions, does exactly what you tell it to do. It does not, however, tolerate ambiguity; it works quickly, tirelessly, literally, but only deductively. This means that the slashes and dashes you see in the instructions and commands will not stand being overlooked. To the computer, they are as important as the letters you enter. That goes for commas and equal marks too. For example, the dash (-) symbol is equivalent to the word "begin" and the computer will not let you begin without it.

RUNNING THE PROGRAMS

Acquiring Your Account (Username) and Password

In order to use the LIAM program on the Cyber computer at CSU, you must acquire an account username from the Instream Flow Group, Western Energy and Land Use Team (WELUT), 2627 Redwing Road, Fort Collins, CO 80526, (303) 226-9331, or directly from CSU. You will be given a username, which you will enter at the appropriate place, along with a personal password. This username and password will give you access to the LIAM program after your telephone and modem connect your terminal with the Cyber.

Procedural Constraints

The computer procedures described in this user's manual follow the formats listed below:

UPPERCASE print will represent the computer's communications to you;

lowercase print will represent the necessary information you will enter on the computer;

parentheses are used around suggestions and comments;

[CR] indicates that you should press the "carriage return," or "return" key on your terminal;

to correct misspelled words, you have some choices: press the CTRL key and the letter H key simultaneously and backspace the correct number of spaces then type in the correct word;

or

press the DEL (delete) key;

3

or

press the arrowed backspace key;

or

check the user's manual for your particular terminal and follow its suggested procedures.

LOGGING ON

Logging on means connecting the terminal to the computer via the modem and telephone, and identifying yourself to the system with your username and password. To log on, follow these steps.

1. Turn on your terminal and modem (hook up your printer to the terminal if you want hard copies too). Now you are ready to make contact with the computer.

2. To connect with the CSU Cyber machine, dial (303) 491-7395 (CSU Computer Center, Accounts) to receive the number to dial directly to the computer. You must inform them of the 'baud' rate of your terminal and printer. See the Glossary regarding baud rates, and your terminal's user's manual concerning the baud rate of your hardware. After you have an account, dial the direct computer number.

3. Wait for a continuous high-pitched tone.

4. Connect your telephone receiver with your modem making sure the handset is correctly matched up with the modem. A light usually indicates a connection has been made with the computer.

5. Press a [CR] and you will see something like this

    ENTER 1 FOR GOLD SYSTEM ENTER 0 FOR GREEN SYSTEM

6. Type 1 on your keyboard. You should always select the Gold System because that is where LIAM resides.

    The computer responds:

        WELCOME TO THE NOS SOFTWARE SYSTEM.
        COPYRIGHT CONTROL DATA 1978, 1983.
        CURRENT DATE AND TIME, C S U G O L D M A C H I N E
        FAMILY:

    This is the computer's procedure for asking you to type in your assigned username and password, which the computer calls your family name. Typing it now is the process of logging on. Be certain to type it precisely as it was given to you, complete with commas and no spaces.

7. Type your username and password as it was given to you, for example:

        ,username,password   and press a [CR]

    (Note: your username and password will usually not be visible on your terminal screen.)

    If both username and password are correct, the computer will proceed. If anything goes wrong, the computer will tell you to retype it; you have two more tries. If you cannot get it right in three tries, you will have to hang-up, redial, and start over. (Sometimes the computer lines are busy and your line is accidentally disconnected. If this happens, go through the log on procedure again. The computer will ask you if you wish to recover your "previous job." It will give you a series of letters and ask you to type them. Once done, you will find yourself back in your previous place. You have 10 minutes to do this. After that, just log on and begin a new job. See "recoverable job" in the Glossary.)

8. Now the computer responds in one of two ways:

        READY.

    or

        /

Type:

        batch   and press a [CR]

(See the Glossary regarding "batch" modes.)

The computer responds:

        $RFL,O.
        /

(See page 6 for how to create a file at this point.)

LOGGING OFF

    Logging off means disconnecting your terminal from the computer. It is commonly done after a program is completed.

1. Type:

    bye   and press a [CR]

    The bye command cuts the communication line permanently. If you wish to regain a communication line, you must hang-up the telephone,

5

pick it up, and redial. Be sure that both the terminal and the modem are on.

Always remember to turn off the terminal and the modem before you leave. If you used a printer, make certain it is off too. (See Example 1.)

CREATING YOUR FILE

It is necessary to create a file for each water resources problem you wish to analyze. Innumerable questionnaire responses can be managed and stored in each file. The only data in your file are those that you put in it. Creating your file is equivalent to making computer space available for your data. Remember, the word "data" here refers to the answers you give to the questions in the questionnaire found in the beginning program named "-Query,,".

When choosing a name for your file, do not exceed seven letters. You will want to give your file a logical name that represents your name or the problem or geographic location you wish to address.

Now that you are logged on, you can create your file.

The computer is waiting:

        $RFL,O.
        /

1. Type:

            xedit, your filename   [CR]

    Example:

            xedit,Redlake   [CR]

    (Leave no spaces.)

    The computer responds:

            XEDIT 3.1.00
            EMPTY FILE/CREATION MODE ASSUMED
            ??

2. Press a [CR]

    The computer responds:

            INPUT
            ?

3. Below is an example of something you might type. It is the first datum for your file, and is your file's title:

6

Example:

        This file will hold data concerning RedLake.   [CR]

If you enter more than one line here, press the [CR] once and
continue to enter. You might want to input a narrative description
of the problem here, or perhaps just give it an identifying geo-
graphic location name. When you have nothing more to enter, press
CR twice and you will be out of the input mode.

The computer responds:

        ??EDIT
        ??

4.   Type:

        End,filename,rl   [CR]

Example:

        End,Redlake,rl   [CR]

("Redlake" is the name given to the file just created. rl is the
command to replace the file in permanent and local filespace.
Remember, your filename must be no longer than seven letters.)

The computer responds:

        REDLAKE IS REPLACED. (This means it is in permanent space.)
        REDLAKE IS A LOCAL FILE. (This keeps it in local space so you
        can work with it.)

You have now instructed the computer to store your file in both
permanent and local filespace. If it were kept only in local space,
it would "disappear" when you logged off. (See Example 2.)

The computer responds:

        READY or

        / (this is your cue that the computer is waiting for you again)

5.   Now, you can do a number of things:

     a.   You can see the catalog of permanent files to assure yourself
          that your file has indeed been created by typing:

          catlist   [CR]

          (It may take a few seconds, see Example 3.)

7

b. You can see the Menu by typing:

-MENU   [CR]

(Wait for it a few seconds, see Example 4.)

c. You can log off (your file will be saved).

d. You can begin answering the LIAM questionnaire to analyze any organization you choose by typing:

-QUERY,,your filename   [CR]

e. If you have previously created your file and you or others have completed the -QUERY questionnaire, you can now review or change your responses by typing:

-LOOKY,,your filename   [CR]

or you can:

graph your data with the -MAPUM,, program (this is appropriate if you have more than three responses for at least two organizations) by typing:

-MAPUM,,your filename   [CR]

or you can:

graph your data with the -PLOTUM,,program onto a Versatec plotter (if you have made prior arrangements with CSU's Computer Center) by typing:

-PLOTUM,,your filename   [CR]

f. You can receive a short computer lesson by typing:

help   [CR]

The glossary of computer terms that begins on page 39 will assist you with your further computer adventures.

Detailed descriptions of the separate LIAM programs are provided in the following pages. Each program has its place in a larger context, which is explained by the LIAM flow chart (Figure 1).

8

Obtain account # and password

Log on

Read MENU

Create file

See Catlist

Run QUERY

Correct or review question-naire: LOOKY

Compare individual responses – reselect comparisons: CONTRAZ

Create line printer output: MAPUM

Create Versatec output: PLOTUM

Create PS 3000 output: PSCOLOR

Rule:
- 3 respondents each agency
- At least 2 agencies
- Up to 15 agencies
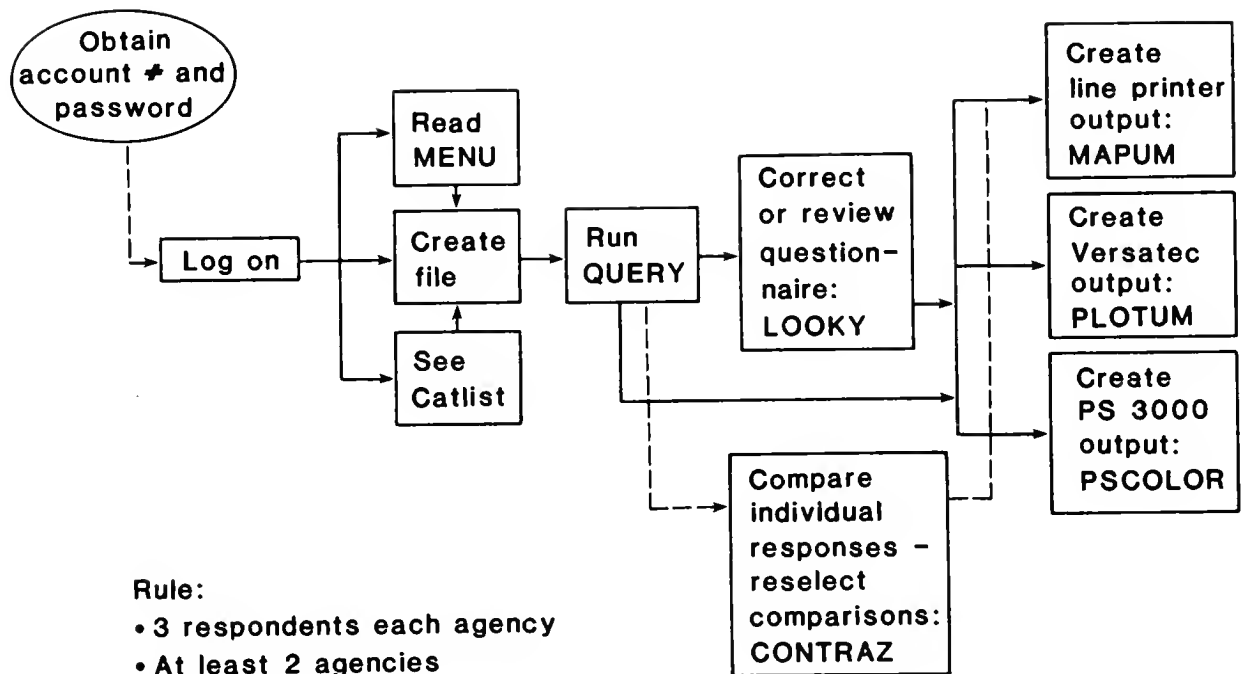
Figure 1. Flow chart for LIAM.

9

THE PROGRAMS

-MENU

    -MENU is an informative listing of programs and capabilities that are available to you in the LIAM package. To read the LIAM MENU, after any computer response of:

    READY or /

type:

    -MENU   [CR]

    (See Example 4.)

-QUERY,,

-QUERY,, is the program name for the LIAM questionnaire. After you create and name your file, you can fill out the questionnaire in -QUERY,,. After a computer response of:

READY or /

type:

-QUERY,,your filename   [CR]

(See Example 5.)

-QUERY,, is composed of 117 questions designed to ascertain particular information regarding a water resource situation. Thirty of the possible 117 questions will be chosen at random for you to answer. Initially, you will be asked to answer four open-ended questions. The remaining questions ask you to select one answer from several choices. You should answer from your knowledge of that organization or agency, i.e., the way you believe that the organization or agency would behave. First, you are asked to enter your project name. This is the name of the specific water resources issue to which LIAM will be applied. Second, you are asked to name the organization or agency you are planning to evaluate. This can be your own organization or another one related to the specific project under assessment. Third, you are asked to list the other participating organizations involved in the project. Fourth, you are asked to define the project or problem in your own words, including the issues, long- and short-term goals, and various levels of involvement for the organization you are evaluating. If you choose to answer these open-ended questions, your responses will be saved in a local file called "Tape 12." When you complete both the open-ended questions and the multiple choice questions, you can see your open-ended answers by typing:

LIST,f=Tape12   [CR]

The 30 multiple choice questions offer choices ranging from A to E from which you are to select one answer, enter its letter on your keyboard, and press a [CR].

When you have completed the multiple choice questions, you will be given the opportunity to review your answers and make any changes you wish. Simply enter the question number when you are prompted by the program. In order to do this, you will have to keep a list of questions which you might wish to review. If you have no changes, press [CR] twice and the program will continue on to its end. Be sure to answer all the questions in the questionnaire.

When you finish the questionnaire, you will see on your screen:

REVERT. THIS PROGRAM IS COMPLETE.

You can choose from a number of options.

1.   You can log off; just type: bye   [CR]

2.   You can see the answers of all the completed questionnaires that are
      stored in your file. These responses can be shown in graph form by
      running the -MAPUM,, program (if you have at least two organizations
      and three responses for each organization); type:

      -MAPUM,,your filename   [CR]

3.   You can review the answers to any questionnaire if you enter the
      -LOOKY,, program; type:

          -LOOKY,,your filename   [CR]

4.   You can see the -MENU; type:

          -MENU

5.   You can see your textual open-ended responses; type:

          LIST,F=TAPE12   [CR]

-LOOKY,,

The -LOOKY,, program allows you to choose a number of options for working with your data. In -LOOKY,, you can examine one respondent's answers at a time. This can help you to:

* see how an individual answered particular questions;

* change answers on a particular questionnaire;

* return to any unanswered questions you might have left when you first took the questionnaire;

* replace your files and store the changes;

* replace your files & not store any changes; or

* look up the indices created by a particular respondent.

To activate the -LOOKY,, program, after a computer response of:

    READY or / or $RFL,O.,

type:

    -LOOKY,,your filename   [CR]

(See Example 6.)

-MAPUM,,

Agencies and individuals dealing with water resources issues often have requested a systematic procedure for preparing decision-making strategies and for anticipating the concerns of the participating organizations in a negotiation. They have suggested that institutional analysis techniques be used for this, and LIAM is one such tool.

With the information gained from the questionnaire in the -QUERY,, program and arranged in the -MAPUM,, program, you are in a position to view your agency and other participating groups from a creative and problem-solving perspective.

The -MAPUM,, program is the main source of output from the LIAM questionnaires. In order to benefit from -MAPUM,, you must be describing at least two organizations with the data from at least three completed questionnaires for each organization. The more data, i.e., more questionnaire respondents, the better your results. The -MAPUM,, program uses the data from the questionnaires to produce a plot that can be routed to your line printer. The -MAPUM,, program:

* combines and summarizes all the questionnaire responses for a given agency;

* identifies the roles of each agency, describing expected concerns and behaviors;

* quantifies power scores for each agency according to resources, information, and support; and

* compares each agency's scores by creating a graph of the data.

All of these products are stored in the MAPO local file that is automatically created by the -MAPUM,, program.

For a more complete explanation of -MAPUM,, and LIAM capabilities, you are encouraged to participate in course IFG 310 offered by the Instream Flow Group. We also suggest that you refer to Instream Flow Information Paper #23 for a detailed exposition of the multidimensional possibilities and uses of LIAM.

To begin the -MAPUM,, program, after a computer response of:

        READY or /

type:

        -MAPUM,,your filename   [CR]

(See Example 7.)

The first information you will see on your screen is a list of names, dates, times, and abbreviations for organizations or groups that you have

14

stored in your file. These responses are your data for the analysis and graphics created in the -MAPUM,, program. The program offers options to select and/or reselect specific respondents from your master list to create "input groups." The individual questionnaire responses are then averaged to create a single unified perspective for each group.

Your first task is to choose a number to represent each name you want to include in one "input" group. When combining names to form a group (each group should contain at least three names.), type the number that represents the name followed by a space and then the next number and space, etc. When all the selected numbers to combine for one group are listed, press a [CR]. If you need to review the respondents list again, type R and press a [CR].

Each time you form a group, the computer will list the names you choose so that you can double check them and assign a title to the group. Now you have a few options. Your terminal will prompt:

1.   REMOVE THIS GROUP AND RESELECT ITS MEMBERS

     This option allows you to change your mind and recombine numbers of respondents. To make these changes, type:

          1   [CR]

     Combine the correct numbers (separating them by spaces) and end with a [CR].

2.   ADD ADDITIONAL RESPONDENTS TO THIS GROUP

     Type:

          2   [CR]

     Then proceed to enter the number representing the name you wish to include in the group you just made.

3.   REVIEW THE MASTER RESPONDENTS LIST

     Type:

          3   [CR]

     Choose 3 to see the list of all respondents.

4.   COMBINE THESE RESPONDENTS INTO A SINGLE GROUP AND BEGIN SPECIFIYING OTHER GROUPS

     Type:

          4   [CR]

     When you have chosen the respondents for the second group, press a [CR].

5. CONSIDER THESE A GROUP AND BEGIN PLOTTING WITH IT AND OTHER COMBINED GROUPS (CHOOSE 5 ONLY AFTER YOU HAVE CREATED AT LEAST TWO GROUPS)

Type:

5   [CR]

When you have combined all the groups you have intended, chose option 5 and press [CR]. The terminal will prompt:

BEGIN PLOTTING

The program is now working with the groups that you have selected and is drawing what is called a "role map" that will characterize each group's position relative to the others'.

You are now asked to select one of two output sizes.

Choice 1 is 80 columns, approximately 8½ x 11" in size. This size will fit completely on your screen and on 8½ x 11" computer print-out paper.

Choice 2 is 132 columns and is the large computer page size. If you choose 2, be prepared to see only part of it on your screen, from which it will not be possible to make any reasonable sense. The print-out will be coherent if it is printed out on large computer paper.

Next you are asked:

WOULD YOU LIKE TO SEE THE LINES PRINTED ON THE PLOT? Y/N

YES: The degree of accuracy is much higher when the lines are printed, but you should choose YES (Y) only when you are using the 132 column output.

NO: Choose NO (N) when you are using the 80 column output.

The computer then responds with:

THESE ARE THE NAMES OF THE INPUT GROUPS.

Here will be listed all the groups you have chosen. Each will be assigned an identifying letter that will correspond to the letters located on the role map and the perspective plot option.

Next you are asked:

PLEASE SELECT THE NUMBER OF THE GROUP FROM WHOSE PERSPECTIVE YOU WISH TO EXAMINE THE OTHER ORGANIZATIONS

Type:

the number that corresponds to that group, [CR]

16

In a few moments, the computer will respond:

    THE PERSPECTIVE PLOT HAS BEEN DRAWN
    WOULD YOU LIKE TO SEE THE PLOT FROM ANOTHER PERSPECTIVE? Y/N

    Yes, type: Y   [CR]

You will be asked to enter the number of the group you wish the second plot to be created from.

    No, type: N   [CR]

The computer will proceed to create the first plot as requested.

    After you complete the information in the -MAPUM,, program, your terminal will display:

    REVERT. *OUTPUT IN LOCAL FILE MAPO.

If you desire a paper copy of the forthcoming graph, connect the printer to your terminal.

Type:

    xon   [CR]

The computer responds:

    XON
    /

After the slash, type:

    list,f=MAPO (with no spaces)   [CR]

You will see on your screen:

    LEGAL INSTITUTIONAL ANALYSIS MODEL (LIAM)
    TABLE TO RESPONDENT POSITIONS AND POLICY POINT

The respondent positions are the positions assigned to the groups you have created. The policy point is intended to identify a point for policy resolution, however, at present, the program does not make this prediction.

    Before we continue, it is necessary to explain some details regarding standard institutional analysis. Four kinds of roles are commonly identified in an institutional analysis. They are the general categories of guardian, advocate, broker, and arbitrator.

    The "guardian" role characterizes agencies or organizations that attempt to protect the productivity or market utility of water. These agencies prefer such strategies as interest group consultation and public participation, because they are backed by established and influential support groups.

The "advocate" role characterizes agencies or groups that call for a change in the developmental approach to water allocation. These agencies are often without enabling legislation or are reactive to the initiative held by other agencies. These groups rely on "crusading" and data to advance their positions.

The "broker" role characterizes agencies that allocate water through their ability to physically control streams via impoundments. "Brokers" are in a position to support either environmental or developmental interests. They favor benefit-cost analyses, mechanisms for controlling flows, and political considerations. Political considerations are possible due to the nature of the groups either supporting or seeking favors from the "brokers." "Brokers" prefer strategies that play activist agencies against each other to obtain control of the balance of power.

The "arbitrator" role characterizes agencies that have the statutory authority to establish instream flow regimes, as well as the ability to legally allocate water. These are usually policy-making agencies that rely on data collected by others and make authorititative allocations after hearing evidence from all sides. "Arbitrators" avoid political or public participation strategies by relying mostly on legal or quasi-legal proceedings and management strategies.

After beginning the MAPO section of the program, LIAM will list the groups that you created by name and assign quantified scores for each of the designated categories of "broker," "arbitrator," "advocate," and "guardian." These scores express the degree to which the groups are expected to follow these designated roles. These scores are assigned a letter to represent the groups that will appear on the graph we call the role-map (Figure 2). The letters determine a position for each group within one of the 16 subquadrants on the role-map. The further from the middle (or origin) on the continuum that the agency is found, either right or left, is an indication of the degree to which the agency being described exhibits that particular role type. The closer to the origin, the more moderate its role intensity; proximity to the edges suggests a more extreme role position. It is important to remember that the role-map attempts to indicate the intensity of a particular role or combination of roles and does not suggest an agency's power.

The computer creates eight subquadrants by drawing an invisible diagonal line from the corners of the graph through the origin. Each subquadrant is assigned a letter, A-J. (See sample graph of role-map, Figure 2). The computer also draws an arc in each quadrant, which functionally creates another eight subquadrants (eight inside and eight outside of the arc). The arc is drawn as a function of the average distance from the origin to all the players in a given quadrant.

For the 132-column role-map, an arc can be accurately drawn as a function of the average distance from the origin to the participating groups (also called "players") in a given quadrant. The 80-column format is too small to allow an accurate display of what the computer has calculated. In further analyses, the role-map participants will be identified by their assigned letter and the quadrant letter on your terminal screen.

18
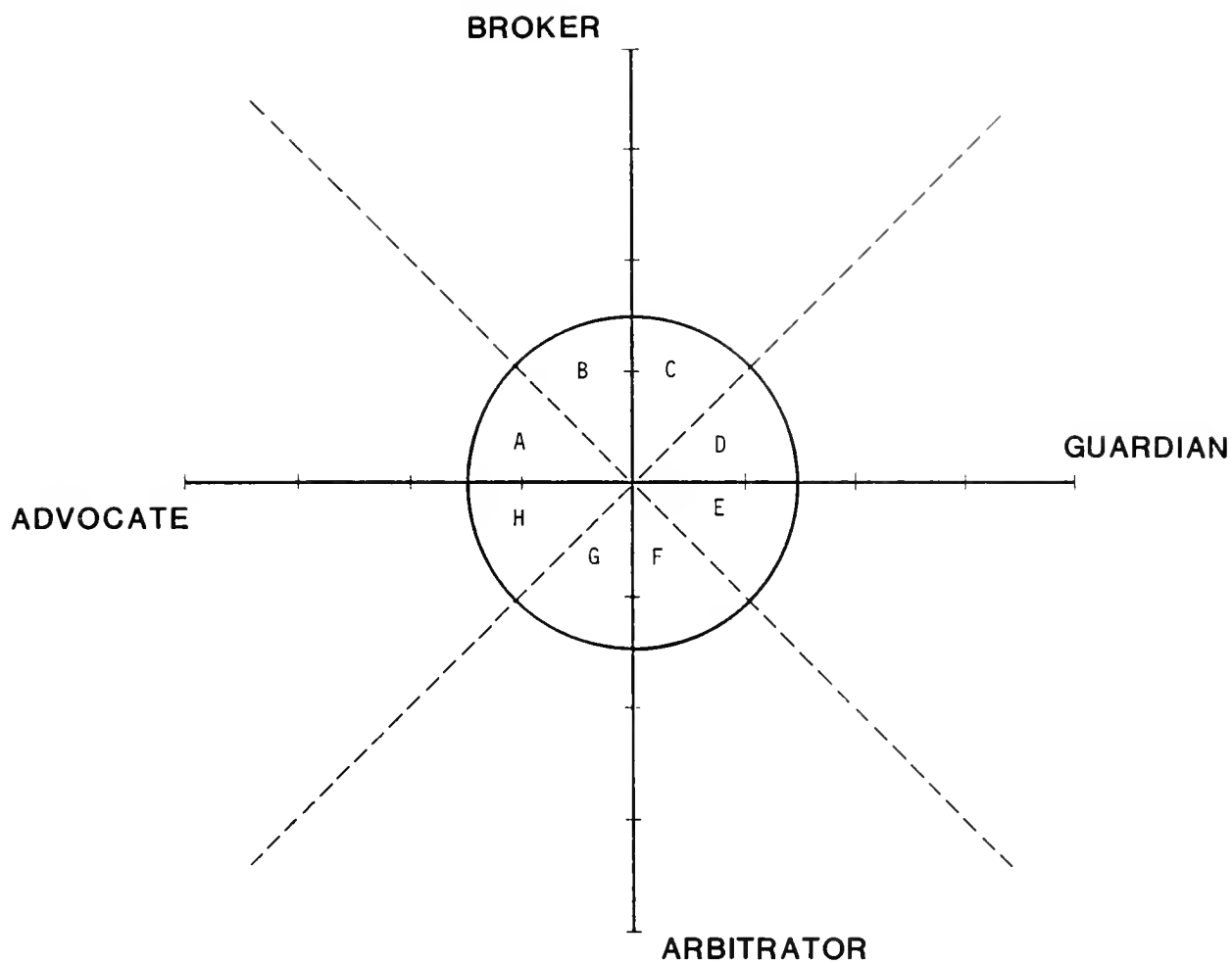
Figure 2. Role-map graph.

You can double check the points assigned to each group yourself. Imagine a 0-4 scale on the role-map, both vertically and horizontally from the origin. The point of origin is equal to the 0 point. Determine the difference between the broker and arbitrator score that the computer displays on your screen. Symbolize it by placing a tentative dot in the direction of the positive score on the vertical axis of the role-map. Do the same thing with the advocate-guardian scores on the horizontal axis.

For example, if the broker score is 3.5, and the arbitrator score is 2.0, place a tentative dot in the direction of the broker quadrants approximately 1.5 points from the origin. In order to find the final placement of the dot, compute the advocate-guardian score and move the dot horizontally in the direction of the positive score.

For example, with an advocate score of 2.0 and a guardian score of 3.0, the difference is 1.0 in the horizontal direction of guardian. Locate the final placement of the marker dot up; from the 1.0 horizontal plane to a point of convergence with the broker-arbitrator tentative dot which is now extended to the right by 1.0 (i.e., broker = 1.5: guardian = 1).

The "AVERAGE QUADRANT ARCS" shown on the screen above the role-map show the point at which the computer calculates the boundary for each quadrant to intersect the horizontal and vertical dimensions. Additionally, resource power, information power, and constituency-support power scores will be determined.

Next, the screen will display in a bar graph the relative power of each agency that you are describing. The asterisk (*) represents an agency's resource powers, the number symbol (#) represents the information powers, and the percentage symbol (%) represents the constituency support for each agency listed.

The predicted roles for each organization will then be listed. A brief explanation of the broker-arbitrator, advocate-guardian tendencies is provided for each organization that you list.

The letter assigned earlier to each group is used next in a final grid that displays the distance between the varied powers (horizontal letter extension) and intensity of roles (vertical spaces) for all agencies in relation to each other. The computer will list the name of the agency from whose perspective the grid views the other agencies' role intensities and perceived power previously identified. Next, the computer shows the relative power and role distances for each agency requested. This completes the analysis.

Your screen will then display:

ANALYSIS COMPLETE

(See a sample run of MAPO in Example 7.)

-PLOTUM,,

The -PLOTUM,, program differs from the -MAPUM,, program in that it creates
a grid of relative positions of the participants on a high resolution Versatec
plot located at CSU Computer Center. It gives none of the open-ended (textual)
information that is found in -MAPUM,,. Prior arrangements must be made to
have this fine-line plot constructed from your questionnaire data by contacting
the CSU Computer Center.

CLOSING REMARKS

The LIAM process helps you as a user and planner to explore the varied dimensions of decision-making and to choose a strong and relevant position for presentation during a negotiation. In addition to technical information, an organization's internal resources and power capabilities are quantified and graphed. Understanding one's own organizational perspective is a major step in creating a unified position at the decision-making table. Other organizations' perceived roles, needs, and concerns can then be directly addressed; alternatives can be proposed and explored.

The scope of the LIAM process is currently expanding. We project that LIAM will be adapted for use on microcomputers in the foreseeable future. An added program called -CONTRAZ,, is presently being developed, which would allow the user to compare the responses and power scores of one respondent to another respondent or to an existing data base and create a histogram or a Versatec plot of the resulting data.

PSCOLOR is another LIAM program whose use is, at present, severely limited. This program allows 35mm color slides to be photographed from a PS300 computer's graphic color screen. The multi-dimensional relationships of different organizations can be easily identified by the output of this program. This program requires the user to work closely with the Western Energy and Land Use Team and to acquire an account for the PS300 machine located at CSU.

Your suggestions and responses to the LIAM process and its accompanying short courses, and ways that the LIAM can be adapted to your particular circumstances, are heartily welcome. Address your comments to: The Instream Flow Group, Western Energy and Land Use Team, Drake Creekside Building One, 2627 Redwing Rd., Fort Collins, CO 80526.

APPENDIX A

<div align="center">Example 1</div>

<div align="center">Logging On and Off</div>

```
 ENTER 0 FOR GREEN SYSTEM
 ENTER 1 FOR GOLD SYSTEM
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1983.

 85/08/15, 14.06.26CSU GOLD MACHINE.
 NOS 2.3-617/617

FAMILY:

        XXX: XXXX, XXX                                    [CR]*

READY.
                                                                   Logging on
batch                   [CR]
$RFL,0.
/


bye                     [CR]
UN=LFATZCK   LOG OFF  14.07.25.
JSN=KGCM      SRU-S=      1.024                             Logging off
CHARACTERS=    0.493KCHS
```

*[CR] is the act of pressing the "carriage return" or "return" key.

Example 2

Creating Your File


```
ENTER 0 FOR GREEN SYSTEM
ENTER 1 FOR GOLD SYSTEM
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1983.

85/08/15. 14.08.08.CSU GOLD MACHINE.
NOS 2.3-617/617

FAMILY:

          XXX: XXXX, XXX

READY.

batch                           [CR]
$RFL,0.
/xedit,redlake                  [CR]
 XEDIT 3.1.00
 EMPTY FILE/ CREATION MODE ASSUMED.
??                              [CR]
 INPUT
? this is my file for the redlake project.    [CR]
? I could stop here or continue entering      [CR]
? information regarding the project.  When    [CR]
? I have entered all that I wish, I must       [CR]
? press two (2) carriage returns to close     [CR]
? my file.                                    [CR]
?
 EDIT
?? end,redlake,rl                [CR]
REDLAKE REPLACED
REDLAKE IS A LOCAL FILE
/
```

Example 3

Reviewing the Catalog of Your Filename

```
/                              [CR]
catlist
 CATALOG OF  LFATZCK          FM/GOLD     85/08/15. 14.11.39.


INDIRECT ACCESS FILES

   DATAB     GOSPEL    KATE     LIAMTX     PROCFIL    SUBLIB    VPLT
   DCOMP     IFG200    LIAMLB   LMTEXT     REDLAKE    TR        WPF


      16 INDIRECT ACCESS FILES,    TOTAL PRUS =        1518.
```

Example 4

Running -Menu Program


```
 ENTER 0 FOR GREEN SYSTEM
 ENTER 1 FOR GOLD SYSTEM
WELCOME TO THE NOS SOFTWARE SYSTEM
COPYRIGHT CONTROL DATA 1978, 1983.

 85/08/15. 14.18.02.CSU GOLD MACHINE.
 NOS 2.3-617/617

FAMILY:

        XXX: XXXX, XXX          [CR]

READY.

batch               [CR]
$RFL,0.
/-menu              [CR]
```

WELCOME TO LIAM (LEGAL INSTITUTIONAL ANALYSIS MODEL). THIS
IS THE MENU WHICH DEMONSTRATES HOW ALL PROGRAMS IN THIS SIMU-
LATION PACKAGE OPERATE. BELOW IS A LIST OF ALL PROGRAMS
AND A SHORT DESCRIPTION OF WHAT THEY DO. TO RUN ANY PROGRAM
YOU MUST SIMPLY TYPE THE SMALL PHRASE THAT APPEARS BEFORE EACH
PROGRAM DESCRIPTION.

PROGRAMS IN THIS MENU MAY BE RUN AFTER A COMPUTER PROMPT (/),
USING COMMANDS SUCH AS THE FOLLOWING: -plotum,,(your filename).
TO RUN THIS PROGRAM (FOR EXAMPLE, IF suzy IS YOUR filename)
YOU WOULD TYPE -plotum,,suzy AND A CARRIAGE RETURN.

REMEMBER: TO THE COMPUTER, COMMAS AND MINUS SIGNS ARE AS
INFORMATIVE AS LETTERS AND NUMBERS. ADDING THEM UNNECESSARILY
CAUSES THE COMPUTER TO DENY KNOWING YOU. NEGLECTING TO ADD
THEM WHEN NECESSARY IS THE MOST COMMON CAUSE OF USER GRIEF AND
IT RESULTS IN YOUR COMMANDS BEING IGNORED AND THE PROGRAM ENDING.
SO GIVE THE MINUS SIGNS AND COMMAS YOUR UTMOST ATTENTION!

         A CARRIAGE RETURN WILL CONTINUE

?

/-NEWQ,,(your filename) -THIS PROGRAM IS THE LONG VERSION OF
        THE LIAM INSTITUTIONAL ANALYSIS QUESTIONNAIRE. IT CON-
        TAINS A FULL LISTING OF ALL QUESTIONS IN THE MASTER LIST.
        DON'T CHOOSE THIS PROGRAM UNLESS YOU WANT TO ANSWER ALL
        OF THE QUESTIONS. NO NEW INSIGHT CAN BE GAINED FROM
        THIS, AS TWO-THIRDS OF THE QUESTIONS ARE REDUNDANT. ALL
        RESPONSES TO THIS QUESTIONNAIRE WILL BE REQUIRED IN THE
        FILE SPECIFIED BY YOUR FILE NAME.

/-QUERY,,(your filename) -THIS PROGRAM IS THE SHORT VERSION OF THE
        LIAM INSTITUTIONAL ANALYSIS QUESTIONNAIRE. ALL RESPONSES
        TO THIS QUESTIONNAIRE WILL BE SAVED IN THE FILE WHICH YOU
        NAME.

    A CARRIAGE RETURN WILL CONTINUE.

/-LOOKY,,(your filename) -ONCE YOU HAVE TAKEN THE LIAM SIMULA-
        TION QUESTIONNAIRE, THIS PROGRAM ALLOWS YOU TO PERFORM
        ANY OF THE FOLLOWING OPERATIONS ON YOUR RESPONSES:

        1) REVIEW YOUR RESPONSES TO THE QUESTIONNAIRE.
        2) ANSWER ALL UNANSWERED QUESTIONS.
        3) PERFORM A RESOURCE/IDEOLOGY ANALYSIS ON
            THE GROUP ANALYZED.
        4) CHANGE YOUR RESPONSE TO ANY QUESTION IN THE
            QUESTIONNAIRE.

/-MAPUM,,(your filename) -THIS PROGRAM ALLOWS YOU, THE USER, TO
        PRODUCE LINE PRINTER QUALITY PLOTS WHICH CAN BE
        ROUTED TO THE NEAREST LINE PRINTER. DATA FOR THIS
        PROGRAM COMES FROM YOUR QUESTIONNAIRE DATA SET OR ANY
        OTHER QUESTIONNAIRES DATA SET YOU SPECIFY.

    A CARRIAGE RETURN WILL CONTINUE.

/-PLOTUM,,(your filename) -THIS IS THE PROGRAM THAT ALLOWS YOU
        TO COMBINE QUESTIONNAIRE RESPONSES TO PRODUCE A
        "VERSATEC" PLOT OF THE INSTITUTIONS INVOLVED IN A
        SIMULATION. THIS PLOT IS OF MUCH FINER QUALITY
        THAN -MAPUM'S LINE PRINTOUT. THE DATA USED FOR
        THIS PLOTTING SEQUENCE COMES FROM YOUR FILE.

/-CONTRAZ,,(your filename) -THIS PROGRAM COMPARES AND CONTRASTS
        TWO OPPOSING ORGANIZATIONS. THIS PROGRAM GIVES BOTH
        THE STRENGTHS AND WEAKNESSES OF EACH ORGANIZATION.
        OUTPUT IS TO THE SCREEN OR TO AN OUTPUT NAMED "OPOZ".

    THIS IS THE CONCLUSION OF THE USER MENU FOR THE LIAM SIMULATION
PACKAGE. DON'T FORGET, IF YOU WANT TO SEE THIS MENU AGAIN AT ANY
TIME FOLLOWING A / SYMBOL MERELY TYPE -MENU AND THESE PROGRAM
DESCRIPTIONS WILL RETURN TO THE SCREEN. GOOD LUCK AND HAPPY
COMPUTING!

    A CARRIAGE RETURN WILL END THE MENU.

?
REVERT
/   (The computer / indicates it is awaiting a command.)

Example 5

Beginning - Query,, Program


```
ENTER 0 FOR GREEN SYSTEM
ENTER 1 FOR GOLD SYSTEM
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1983.

 85/08/85  14.06.26CSU GOLD MACHINE
 NOS 2.3-617/617

FAMILY:

        XXX: XXXX, XXX          [CR]

READY.

batch                          [CR]
$RFL,0.
/-query,,redlake  [CR]
```


                    WELCOME TO THE LIAM SIMULATION PACKAGE

        THIS IS THE QUESTIONNAIRE THAT HELPS YOU ANALYZE THE VARIOUS
        ORGANIZATIONS AND SPECIAL INTEREST GROUPS WHO INFLUENCE PUBLIC
        POLICY DECISIONS. IF YOU HAVE NOT RUN THIS SIMULATION BEFORE
        AND WOULD LIKE TO BETTER ACQUAINT YOURSELF WITH ITS OPERATION
        TYPE 'HELP' NOW. FIRST TIME USERS CERTAINLY SHOULD TYPE 'help'.
        THIS WILL PROVIDE SPECIAL EXPLANATIONS DURING THE QUESTION-
        NAIRE THAT WILL HELP YOU UNDERSTAND HOW THE PROGRAM WORKS
        AND EXPLAIN THE PROPER WAY TO RESPOND TO THE VARIOUS QUESTIONS
        ASKED DURING THIS SIMULATION. IF YOU HAVE ALREADY TAKEN THIS
        QUESTIONNAIRE BEFORE AND ARE FAMILIAR WITH ITS OPERATION, A
        CARRIAGE RETURN WILL CAUSE THESE MESSAGES TO BE SUPPRESSED THUS
        SPEEDING UP THE QUESTIONING PROCESS.

            (PLEASE ENTER A CARRIAGE RETURN OR TYPE 'HELP')

/ (program continues)

Example 6

Running -Looky,, Program

 ENTER 0 FOR GREEN SYSTEM
 ENTER 1 FOR GOLD SYSTEM
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1983.

 85/08/15, 14.06.26CSU GOLD MACHINE
 NOS 2.3-617/617

FAMILY:

       XXX: XXXX, XXX   [CR]

READ .

batch   [CR]
$RFL,0.

/-looky,,redlake   [CR]

                 (Program begins ...)

Example 7

Running -Mapum,, Program

ENTER 0 FOR GREEN SYSTEM
ENTER 1 FOR GOLD SYSTEM
WELCOME TO THE NOS SOFTWARE SYSTEM.
COPYRIGHT CONTROL DATA 1978, 1983.

 85/08/05. 14.47.22.CSU GOLD MACHINE.
 NOS 2.3-617/617

FAMILY:

          XXX: XXXX, XXX   [CR]

READY.

batch   [CR]
$RFL,0.
/-mapum,,redlake   [CR]

        WELCOME TO THE LIAM PLOTTING PROGRAM

     THESE ARE ALL RESPONDENTS IN THE INPUT FILE:

                  Name
  1) Respondent #1   7/14/85   5:35   FOR-DEPT OF FISH
  2) Respondent #2   07/15/85   5:37   FOR-FISHERIES
  3) Respondent #3   07/15/85   17:42   FOR-DEPT FISH
  4) Respondent #4   7/15/85   5:59 PM   FOR-CITY OF SEATTLE
  5) Respondent #5   07/15/85   06:55 PM   FOR-DOE
  6) Respondent #6   07/15/85   06:24 PM   FOR-DOE
  7) Respondent #7   25/85   :36 AM   FOR-CITY OF SEATTLE
  8) Respondent #8   7725785   4:07 PM   FOR-CITY OF SEATTLE
  9) Respondent #9   8/8/85   10:11 AM   FOR-CITY OF SEATTLE
 10) Respondent #10   08/09/85   14:56 AM   FOR-DEPARTMENT OF GAME
 11) Respondent #11   8/15/85   9:32 AM   FOR-CITY OF SEATTLE
 12) Respondent #12   8/14/85   10:10 AM   FOR-CITY OF SEATTLE

     PLEASE SELECT THE RESPONDENTS THAT WILL BE
     INCLUDED IN THIS PLOT. IF MORE THAN ONE
     RESPONDENT IS TO BE COMBINED TO CREATE A GROUP
     ENTER THEM ON ONE LINE WITH ONLY A SPACE BETWEEN
     THEM (EX:3 4 6) AND THEN PRESS A CARRIAGE
     RETURN. TO REVIEW THE RESPONDENTS ONCE AGAIN
     TYPE: R [CR]

     ?   (program continues; choose appropriate responses)

?   1 2 3

YOU HAVE SELECTED THE FOLLOWING FILES TO BE
COMBINED AS ONE GROUP AND OUTPUT:

```
RESPONDENT #1   (7/14/85         5:35      )    FOR-DEPT OF FISH
RESPONDENT #2   (07/15/85        5:37      )    FOR-FISHERIES
RESPONDENT #3   (07/15/85        17:42     )    FOR-DEPT FISH
```

   WHAT TITLE WOULD YOU LIKE FOR THIS COMBINED GROUP?

? fng   (you can give it any title you desire)

     YOU CAN NOW SELECT FROM A VARIETY OF OPTIONS:

     1)   REMOVE THIS GROUP AND RESELECT ITS MEMBERS
     2)   ADD ADDITIONAL RESPONDENTS TO THIS GROUP
     3)   REVIEW THE MASTER RESPONDENTS LIST
     4)   COMBINE THESE RESPONDENTS INTO A SINGLE
            GROUP AND BEGIN SPECIFYING OTHER GROUPS
     5)   CONSIDER THESE A GROUP AND BEGIN PLOTTING WITH IT
            AND OTHER COMBINED GROUPS (CHOOSE OPTION 5 ONLY AFTER
            YOU HAVE CREATED AT LEAST 2 GROUPS)

     PLEASE SELECT ONE OPTION AND TYPE A CARRIAGE RETURN.

?   4

     PLEASE ENTER THE NUMBERS OF THOSE RESPONDENTS
     TO BE COMBINED FOR THE NEXT GROUP.
             (TO REVIEW ALL GROUPS TYPE: R [CR])

? 7 8 9

     YOU HAVE SELECTED THE FOLLOWING FILES TO BE
          COMBINED AS ONE (GROUP AND OUTPUT):

```
RESPONDENT #1   (25/85          :36 AM    )    FOR-CITY OF SEATTLE
RESPONDENT #2   (7725785        4:07 PM   )    FOR-CITY OF SEATTLE
RESPONDENT #3   (8/8/85         10:11 AM  )    FOR-CITY OF SEATTLE
```

     WHAT TITLE WOULD YOU LIKE FOR THIS COMBINED GROUP?

? city

     YOU CAN NOW SELECT FROM A VARIETY OF OPTIONS:

     1)   REMOVE THIS GROUP AND RESELECT ITS MEMBERS
     2)   ADD ADDITIONAL RESPONDENTS TO THIS GROUP
     3)   REVIEW THE MASTER RESPONDENTS LIST
     4)   COMBINE THESE RESPONDENTS INTO A SINGLE
            GROUP AND BEGIN SPECIFYING OTHER GROUPS
     5)   CONSIDER THESE A GROUP AND BEGIN PLOTTING WITH IT
            AND OTHER COMBINED GROUPS (CHOOSE OPTION 5 ONLY AFTER
            YOU HAVE CREATED AT LEAST 2 GROUPS)

PLEASE SELECT ONE OPTION AND TYPE A CARRIAGE RETURN.

? 4

PLEASE ENTER THE NUMBERS OF THOSE RESPONDENTS
TO BE COMBINED FOR THE NEXT GROUP.
(TO REVIEW ALL GROUPS TYPE: R [CR])

? 5 6

YOU HAVE SELECTED THE FOLLOWING FILES TO BE
COMBINED AS ONE GROUP AND OUTPUT:

RESPONDENT #5 (07/15/85   06:55 PM   )   FOR-DOE
RESPONDENT #6 (07/15/85   06:24 PM   )   FOR-DOE

WHAT TITLE WOULD YOU LIKE FOR THIS COMBINED GROUP?

? manager   .

YOU CAN NOW SELECT FROM A VARIETY OF OPTIONS:

1)   REMOVE THIS GROUP AND RESELECT ITS MEMBERS
2)   ADD ADDITIONAL RESPONDENTS TO THIS GROUP
3)   REVIEW THE MASTER RESPONDENTS LIST
4)   COMBINE THESE RESPONDENTS INTO A SINGLE
         GROUP AND BEGIN SPECIFYING OTHER GROUPS
5)   CONSIDER THESE A GROUP AND BEGIN PLOTTING WITH IT
         AND OTHER COMBINED GROUPS (CHOOSE OPTION 5 ONLY
         AFTER YOU HAVE CREATED AT LEAST 2 GROUPS)

PLEASE SELECT ONE OPTION AND TYPE A CARRIAGE RETURN.

? 5

IF YOU ARE CERTAIN THAT THESE ARE ALL THE GROUPS
YOU WISH TO ENTER HIT THE CARRIAGE RETURN AGAIN.
IF YOU WOULD LIKE TO REVIEW THE GROUPS A LAST TIME
TYPE: R [CR]

?

BEGIN PLOTTING   .

YOU MAY SELECT ONE OF TWO OUTPUT SIZES
(80 COLUMNS IS AN 8.5 BY 11 SIZE AND FITS
ON YOUR TERMINAL SCREEN; 132 COLUMNS IS A
LARGER COMPUTER PRINT OUT SIZE).

1)   80 COLUMN
2)   132 COLUMN

PLEASE CHOOSE 1) OR 2) AND PRESS A CARRIAGE RETURN.

? 1

32

```
     WOULD YOU LIKE TO SEE THE LINES PRINTED ON
     THE PLOT? Y/N

?  y

     SHOULD GROUP PERSPECTIVE PLOTS BE INCLUDED IN THE OUTPUT? Y/N

?  y

     THESE ARE THE NAMES OF THE INPUT GROUPS:

     1)   FNG
     2)   CITY
     3)   MANAGER

     PLEASE SELECT THE NUMBER OF THE GROUP FROM
     WHOSE PERSPECTIVE YOU WISH TO EXAMINE THE
     OTHER ORGANIZATIONS.

?  1

THE PERSPECTIVE PLOT HAS BEEN DRAWN.

     WOULD YOU LIKE TO SEE THE PLOT FROM ANOTHER
     PERSPECTIVE?   Y/N

?  y

     THESE ARE THE NAMES OF THE INPUT GROUPS:

     1)   FNG
     2)   CITY
     3)   MANAGER

     PLEASE SELECT THE NUMBER OF THE GROUP FROM
     WHOSE PERSPECTIVE YOU WISH TO EXAMINE THE
     OTHER ORGANIZATIONS.

?  2

THE PERSPECTIVE PLOT HAS BEEN DRAWN.

     WOULD YOU LIKE TO SEE THE PLOT FROM ANOTHER
     PERSPECTIVE?   Y/N

ANALYSIS COMPLETE.*OUTPUT IN LOCAL FILE MAPO.
list,f=mapo
```

LEGAL INSTITUTIONAL ANALYSIS MODEL (LIAM)

TABLE OF RESPONDENT POSITIONS AND POLICY POINT

TABLE OF RESPONDENT POSITIONS AND POLICY POINT

FNG

BROKER SCORE -   3.3
ARBITRATOR SCORE -   3.1
ADVOCATE SCORE -   4.5
GUARDIAN SCORE -   1.6
RESOURCE POWER -   3.3
INFORMATION POWER -   3.5
CONSTITUENCY SUPPORT -   3.6

CITY

BROKER SCORE -   3.6
ARBITRATOR SCORE -   3.0
ADVOCATE SCORE -   2.4
GUARDIAN SCORE -   4.0
RESOURCE POWER -   3.5
INFORMATION POWER -   3.9
CONSTITUENCY SUPPORT -   2.5

MANAGER

BROKER SCORE -   3.1
ARBITRATOR SCORE -   3.1
ADVOCATE SCORE -   4.1
GUARDIAN SCORE -   2.5
RESOURCE POWER -   2.4
INFORMATION POWER -   4.1
CONSTITUENCY SUPPORT -   1.9

AVERAGE QUADRANT ACRS

    1ST - 1.7
    2ND - 2.2
    3RD - 0.0
    4TH - 0.0

```
--EOR
*****************************************************************
*                        *                       A-FNG
*                        *                       B-CITY
*                        B                       C-MANAGER
*                        R                                  *
*                        D                                  *
*                        K                                  *
*                   X    E                                  *
*                 X      R    X    BB                       *
*        AA      CC      *        XBB                       *
*        AA      CC      *          X                       *
******ADVOCATE*************************GUARDIAN******
*                        *                                  *
*                        *                                  *
*                        *                                  *
*                        A                                  *
*                        R                                  *
*                        B                                  *
*                        I                                  *
*                        T                                  *
*                        *                                  *
*                        *                                  *
*****************************************************************
```

THIS IS HOW ALL GROUPS INVOLVED IN THIS SIMULATION APPEAR TO CITY:

```
                                                          V     V
                                                       V     V
                                                        V  V
                                                         V
1BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB        &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
3CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
3AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA&
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&                                                                               &
&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
```

ANALYSIS COMPLETE

THIS IS HOW ALL GROUPS INVOLVED IN THIS SIMULATION APPEAR TO FNG:

```
                                                                          V    V
                                                                           V  V
                                                                            V
1AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA&
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
3CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC       &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
3BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB&
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&                                                                             &
&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
```
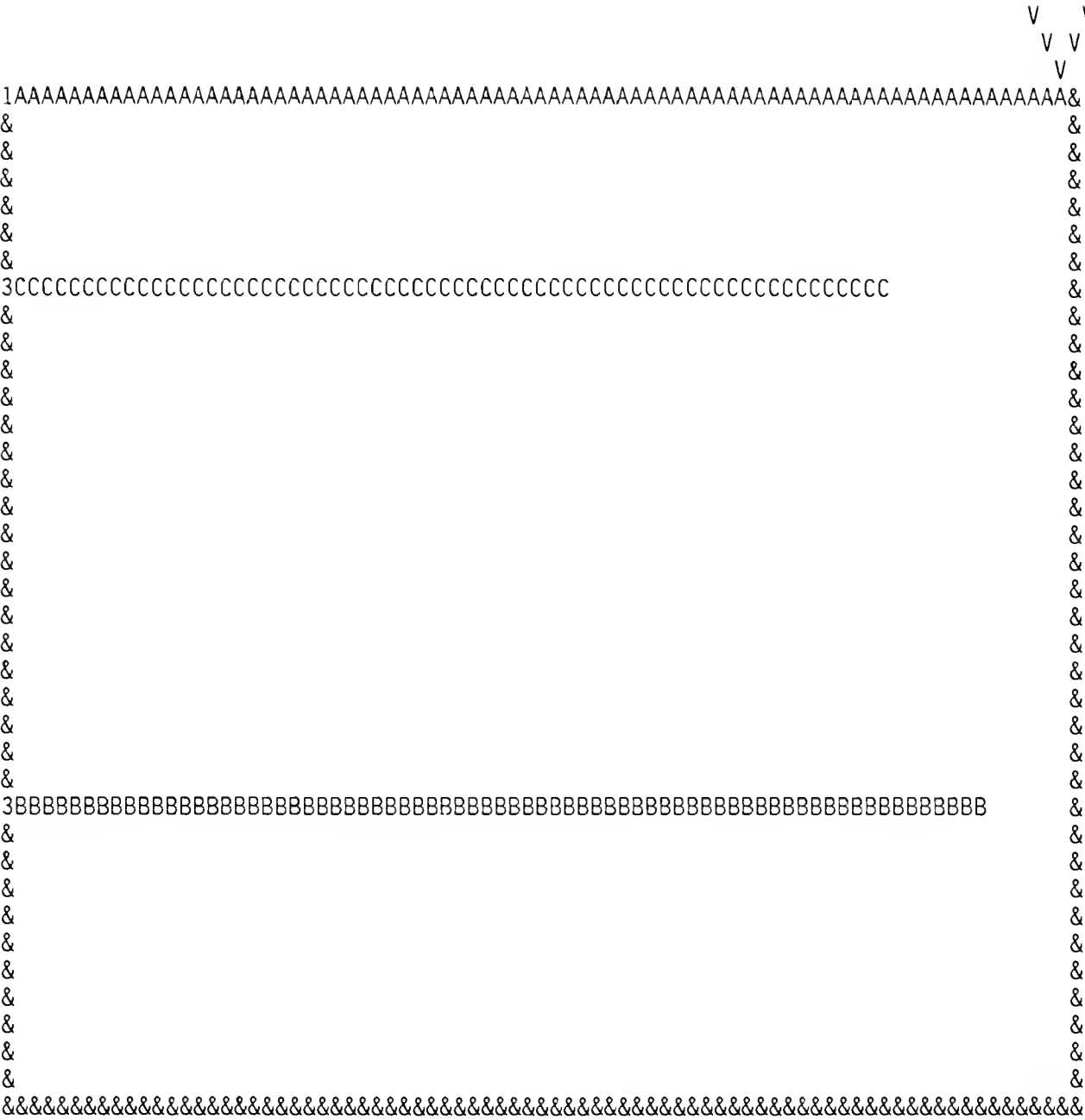
LEGEND

```
* * * * * * * *
 * * * * * * * *    - RESOURCE POWER
* * * * * * * * *


*****************
 *   *   *   *   *   *
 *   *   *   *   *   *    - INFORMATION POWER
*****************


%/%/%/%/%/%/%/%/%/%/%/%/%
 %   %   %   %   %
  %   %   %   %   %   % - CONSTITUENCY SUPPORT
%/%/%/%/%/%/%/%/%/%/%/%/
```

THESE ARE THE PREDICTED ROLES FOR EACH ORGANIZATION:

FOR FNG
SUBQUADRANT: P
ROLE INTENSITY: EXTREME ADVOCATE-BROKER

     TENDS TO BE QUITE ACTIVE AND VOCAL ON BEHALF OF CHANGING THE WAYS IN WHICH BUSINESS HAS BEEN CONDUCTED IN THE PAST, BUT PREFERS TO OPERATE IN THE POLITICAL ARENA, WHERE SOLUTIONS ARE THE RESULT OF BARGAINING AND COMPROMISE. CONSIDERS FACTUAL ARGUMENTS, PROVIDED THEY DO NOT RUN OPPOSITE TO POLITICAL CONSIDERATIONS. TENDS TO BE IDEOLOGICAL. WILL PUSH FOR A POLITICAL SOLUTION.

FOR CITY
SUBQUADRANT: E
ROLE INTENSITY: MODERATE GUARDIAN-BROKER

     PREFERS TO OPERATE IN THE POLITICAL ARENA, ESPECIALLY TO PRESERVE THEIR OWN INTERESTS AND WAYS IN WHICH THEIR BUSINESS HAS BEEN CONDUCTED IN THE PAST. IS LIKELY TO BE INFLUENCED BY ARGUMENTS WHICH DEMONSTRATE THE CONNECTIONS BETWEEN THE PROPOSED SOLUTION AND THEIR OWN INTERESTS, ESPECIALLY ON ECONOMIC TERMS, AS WELL AS THE INTEREST OF THEIR CLIENTS. TENDS TO FAVOR BARGAINED SOLUTIONS FACILITATED BY A POLITICAL ENTITY, RATHER THAN DECISIONS BASED ON SCIENTIFIC AND/OR TECHNICAL INFORMATION DECIDED BY AN OBJECTIVE REGULATOR. SPEAKS OF CONSTITUENCY SUPPORT AND PROJECT DEVELOPMENT.

FOR MANAGER
SUBQUADRANT: H
ROLE INTENSITY: MODERATE ADVOCATE-BROKER

     PREFERS TO CHANGE THE WAYS IN WHICH DECISIONS HAVE BEEN MADE IN THE PAST, BUT ALSO TO DEVELOP BARGAINED SOLUTIONS FACILITATED BY A POLITICAL COALITION. WILL USE SCIENTIFIC/TECHNICAL INFORMATION, BUT WILL ALSO NEED TO DEMONSTRATE CONSTITUENT SUPPORT ON BEHALF OF SUCH CHANGE. SPEAKS OF CONSERVATION AND THE ECOLOGICAL PERSPECTIVE.

38

GLOSSARY

abort - TO BE USED WITH THE -QUERY,, PROGRAM, YOU CAN TYPE abort AND YOU WILL
    BE GIVEN THREE CHOICES: A. YOU CAN CONTINUE THE QUESTIONNAIRE, B.   YOU
    CAN STOP TAKING THE QUESTIONNAIRE AND SAVE THE RESPONSES UP TO THAT
    POINT, OR C. YOU CAN STOP THE QUESTIONNAIRE PROCESS AND NOT SAVE THE
    RESPONSES.

accuracy, speed and tirelessness - THREE REASONS YOU ARE USING A COMPUTER!

analog - AN ADJECTIVE FOR THE COMPUTERS THAT DO SOMETHING SPECIFIC RATHER THAN
    TELL YOU SOMETHING.

backspace - A FEW WAYS TO ERASE: (1) PRESS CTRL (CONTROL) KEY AND THE H KEY
    SIMULTANEOUSLY ON YOUR KEYBOARD AND, AS THE CURSOR MOVES BACKWARDS, YOUR
    INCORRECTLY ENTERED LETTERS OR NUMBERS WILL BE DELETED; RESUME TYPING
    WHEN YOU HAVE DISCARDED UNWANTED CHARACTERS; (2) PRESS DEL (DELETE) KEY
    ONCE FOR EACH LETTER YOU WISH TO REMOVE; (3) PRESS BACKSPACE KEY (CHECK
    YOUR TERMINAL'S USER'S MANUAL FOR THE CORRECT PROCEDURE.)

batch mode - A MODE OF PROCESSING DATA. IN THIS MODE, WHEN YOU RUN YOUR
    COMPUTER PROGRAM, ALL THE INPUT DATA IS LOADED INTO THE SYSTEM IN A BIG
    BATCH. THE PROGRAM, ALONG WITH THE INSTRUCTIONS ABOUT HOW TO COMPUTE THE
    DATA AND ALL THE POSSIBLE SOLUTIONS, ARE RUN AT SOME LATER TIME, IN YOUR
    CASE PROBABLY MILLI-SECONDS LATER. THIS MODE IS LESS EXPENSIVE THAN
    OTHERS.

baud rate - THE SPEED AT WHICH THE COMPUTER ACKNOWLEDGES YOUR KEYBOARD ENTRIES.
    300 IS A COMMON (AND SLOW) RATE; 1200 BAUD IS QUICK, ABOUT AS FAST AS THE
    EYE CAN READ; AND 4800 BAUD IS DOWNRIGHT SPEEDY.

boot - THE PROCESS OF STARTING UP A PERSONAL OR MICRO-COMPUTER AND GETTING IT
    TO DO SOMETHING. MOST COMPUTERS HAVE TO BE FED DIRECTIONS TO TURN ON THE
    OPERATING SYSTEM BEFORE THEY CAN BE TOLD WHAT ELSE TO DO. GIVING THOSE
    INSTRUCTIONS TO THE COMPUTER, USUALLY VIA A DISKETTE, IS CALLED 'BOOTING'
    THE SYSTEM. THE LIAM PROCESS WILL BE AVAILABLE FOR MICRO-COMPUTER USE IN
    THE FUTURE.

break - THE BREAK KEY INTERRUPTS AND SUSPENDS THE PROGRAM YOU ARE CURRENTLY
    RUNNING. TO RESUME OPERATIONS IN THE SAME PLACE, PRESS THE CARRIAGE
    RETURN KEY. LIAM PROGRAMS ARE SHORT ENOUGH THAT YOU SHOULD NOT NEED TO
    USE THIS KEY.

bug - A HOLE IN THE BASIC LOGIC OF THE PROGRAM THAT WILL CAUSE IT TO FAIL:
    NAMED AFTER A REAL BUG THAT DIED AND MELTED ONTO A PIECE OF COMPUTER
    EQUIPMENT IN THE 1950's, AND IN SO DOING, BROUGHT THE WHOLE PROGRAM TO A
    HALT.

bye - THIS IS A COMMAND TO THE COMPUTER THAT TERMINATES THE COMMUNICATION TO
    YOUR TERMINAL. YOU USE THIS COMMAND WHEN YOU ARE LOGGING OFF.

catlist - THIS IS A COMMAND THAT CALLS TO YOUR ATTENTION A CATALOG LISTING OF
    ALL THE FILES LOCATED IN THE PERMANENT FILE SPACE. YOU MIGHT CHECK HERE
    AFTER YOU CREATED YOUR FILESPACE IN xedit BECAUSE YOUR QUESTIONNAIRE
    RESPONSES WILL BE STORED THERE. ANOTHER TIME TO CHECK THE catlist MIGHT
    BE AFTER YOU HAVE RUN -MAPUM,, WHEN THE FILE mapo HAS BEEN CREATED IN
    YOUR LOCAL FILESPACE AND YOU DECIDE TO KEEP IT IN PERMANENT FILESPACE.
    TO DO SO, JUST TYPE replace,mapo AND A CR.

computerphobia - AN UNREALISTIC FEAR OF COMPUTERS OVERCOME BY HANDS-ON PRACTICE
    AND REMEMBERING THAT (1) MISTAKES ARE NATURAL AND (2) THE COMPUTER WON'T
    BREAK OR REPLACE YOU.

computerphrenia - AN EXAGGERATED BELIEF IN THE CAPABILITIES OF COMPUTERS.

crash - A TOTAL COMPUTER MALFUNCTION; A SYSTEM DEATH. DON'T LOOSE HEART:
    BEGIN AGAIN. 1) TYPE THE REWIND * COMMAND, AND, 2) TYPE:

        -PROGRAMNAME,FILENAME   [CR]

creation mode - THE CONTEXT WITHIN THE xedit PROGRAM THAT ALLOWS YOU TO CREATE
    A FILE IN WHICH THE ANSWERS TO THE LIAM QUESTIONNAIRE WILL BE STORED.

CTRL key - A KEY TO USE WITH THE "h" KEY TO BACKSPACE AND ERASE AN UNWANTED
    WORD OR NUMBER. JUST PRESS THEM BOTH SIMULTANEOUSLY AND THE CURSOR WILL
    GO BACKWARDS ONE SPACE AT A TIME UNTIL YOU RELEASE THE KEYS. WHEN xon
    HAS BEEN ACTIVATED, PRESSING ctrl AND s KEYS SIMULTANEOUSLY WILL STOP A
    FILE FROM PRINTING, AND ctrl AND q WILL RESUME THE PRINTING. (SEE xon IN
    GLOSSARY).

cursor - THE FLASHING MARK ON YOUR TERMINAL SCREEN THAT TELLS YOU THE PLACE
    YOUR KEYBOARD WILL RECORD YOUR ENTRIES. ALL ANSWERS, TEXT, ETC. IS
    ENTERED OR DELETED AT THE POSITION OF THE cursor. A cursor IS NOT A
    FRUSTRATED USER WHO SHOUTS AT THE COMPUTER.

cyber - THE COMPUTER SYSTEM AT COLORADO STATE UNIVERSITY WHICH YOU ARE USING
    IN CONJUNCTION WITH THE LIAM PROCESS. CYBER SERIES COMPUTERS ARE PRODUCED
    BY CONTROL DATA CORPORATION.

deductive reasoning - A FORM OF LOGIC THAT MOVES FROM A GENERAL RULE TO A
    SPECIFIC CASE. THE COMPUTER IS FUNCTIONING DEDUCTIVELY WHEN IT LETS YOU
    ADAPT THE LIAM THEORY TO YOUR SPECIAL SITUATION.

digital - AN ADJECTIVE WHICH DESCRIBES COMPUTERS THAT MANIPULATE NUMBERS AND
    WORDS TO GIVE YOU INFORMATION. THIS IS AN ALTERNATIVE TO AN ANALOG
    COMPUTER.

end,,rl - A GOOD COMMAND IN THE xedit PROGRAM WHEN YOU FINISH CREATING YOUR
    FILE. TYPE THIS AND YOUR FILE IS REPLACED IN PERMANENT FILESPACE.

eoi encountered - THE COMPUTER'S NOTATION TELLING YOU THAT YOU HAVE COME TO
    THE 'END OF INFORMATION' IN YOUR FILE. THIS IS NOT AN ERROR. A rewind,
    filename COMMAND WILL REWIND THE FILE FOR YOU.

file, filename - IS A RECORD OF THE ENTRIES (QUESTIONNAIRES OR TEXTS) YOU
    CREATE TO WORK WITH FOR THE LIAM PROCESS; filename IS THE NAME YOU GIVE
    YOUR FILE.

filespace - TWO KINDS:

    local filespace - TEMPORARY FILES THAT EXIST AS A RESULT OF A PROGRAM OR
        COMMAND EXECUTION, LIKE mapo. IF THEY ARE NOT SAVED, THEY WILL
        DISAPPEAR WHEN YOU log off. SAVE THEM IN xedit WITH A replace,
        filename COMMAND.

    permanent filespace - FILES STORED REMOTELY ON MASS STORAGE DEVICES WHICH
        MUST BE RETRIEVED TO BE USED. LIAM IS LOCATED IN PERMANENT FILESPACE
        FROM WHICH YOU CREATE YOUR LOCAL FILES.

glitch - AN ANNOYING AND NON-SUBSTANTIVE ERROR THAT CAN STOP YOU COLD BUT IS
    EASILY FIXED BY A GLANCE AT THIS PRIMER PERHAPS OR AT THE 'TROUBLE-
    SHOOTING' SECTION.

hardware - THE PHYSICAL COMPUTER; ALL THE PARTS OF THE COMPUTER THAT YOU CAN,
    BUT SHOULD NOT, KICK WHEN THINGS GO AMUCK.

hello - A COMMAND THAT ALLOWS YOU TO log off YOUR PRESENT USAGE AND log on
    AGAIN USING ANOTHER USER NUMBER WITHOUT HANGING UP AND REDIALING. JUST
    TYPE hello AND YOU WILL BEGIN THE Logging on PROCESS OVER AGAIN BY ENTER-
    ING YOUR USERNAME AND PASSWORD AS REQUESTED.

help - A COMMAND THAT WILL LIST ALL COMMANDS AND FUNCTIONS AVAILABLE UNDER THE
    NETWORK OPERATING SYSTEM (NOS) AND A SHORT DESCRIPTION OF THEM (EXCEPT IN
    THE -QUERY,,PROGRAM) TO HELP YOU OPERATE YOUR PROGRAM.

idle - A COMPUTER RESPONSE TO YOU SAYING IT IS "ALIVE" AND WELL AND AWAITING
    YOUR INPUT.

inductive reasoning - A FORM OF LOGIC THAT MOVES FROM SPECIFIC CASES TO GENERAL
    THEORY; MORE CHARACTERISTIC OF HUMANS THAN COMPUTERS.

infinite loop - SEE loop.

interactive terminal - AN INPUT-OUTPUT DEVICE THAT ALLOWS YOU TO "TALK BACK"
    TO THE COMPUTER. YOUR TERMINAL ALLOWS YOU TO ACCESS YOUR FILES AND RUN
    YOUR PROGRAMS BY FOLLOWING THE COMPUTER'S QUESTIONS AND PROMPTS.

interrupt - IF YOU WISH TO STOP YOUR TERMINAL FROM LISTING YOUR FILE OR
    PRINTING YOUR DATA, PRESS THE break KEY ON YOUR KEYBOARD. THIS ACTION
    interrupts THE READOUT; A CARRIAGE RETURN WILL RESUME IT.

keyboard paralysis - ACUTE, UNEXPECTED SELF-CONSCIOUSNESS BEFORE A COMPUTER
    TERMINAL WHICH DISAPPEARS AFTER AN HOUR OF GENTLE INTERACTION WITH A
    FRIENDLY COMPUTER PROGRAM SUCH AS -QUERY,,.

list,f=mapo - THIS COMMAND IS USED WHEN YOU WISH TO LOOK AT YOUR MAPO FILE.
    AFTER YOU HAVE RUN THE -MAPUM,, PROGRAM, AND THE COMPUTER SIGNALS:

        REVERT.*OUTPUT IN LOCAL FILE MAPO.

    TYPE:

        list,f=mapo   [CR]

    AND YOU WILL BEGIN THE GRAPHIC RESULTS OF THE PROGRAM.

list,f=Tape12 - THIS COMMAND IS USED WHEN YOU WISH TO LOOK AT YOUR OPEN ENDED
    QUESTIONS AND ANSWERS IN THE QUERY QUESTIONNAIRE. AFTER A COMPUTER
    RESPONSE OF /,

    TYPE:

        list,F=Tape12   [CR]

local files - INTERACTIVE AND TEMPORARY FILES THAT EXIST AS A RESULT OF YOUR
    COMMAND EXECUTION. TO SAVE ANYTHING YOU SUSPECT IS A LOCAL FILE ONLY,
    SIMPLY TYPE replace,your filename BEFORE YOU log off.

logging off - THE ACT OF DISCONNECTING YOUR TERMINAL FROM THE CSU CYBER
    COMPUTER. AFTER REPLACING YOUR FILE, SIMPLY TYPE bye AND YOUR ELECTRIC
    RELATIONSHIP WITH THE COMPUTER WILL BE TERMINATED.

logging on - THE ACT OF TELLING THE COMPUTER THAT YOU, A NEW USER, ARE READY
    TO BEGIN WORKING. HAVE YOUR ACCOUNT USERNAME AND PASSWORD READY TO GIVE
    THE CYBER COMPUTER WITH YOUR TERMINAL AND MODEM TURNED ON.

loop - SEE infinite loop.

menu-drive - AN ADJECTIVE USED TO DESCRIBE A FRIENDLY PROGRAM - LIKE LIAM -
    THAT GIVES YOU CHOICES OF WHAT YOU WOULD LIKE TO DO WITH THE COMPUTER.
    THEN YOU JUST CHOOSE FROM THE -MENU. TO SEE IT, JUST TYPE: -MENU
    (REMEMBER THE DASH).

modem - MOdulator-DEModulator, TO BE EXACT: A DEVICE THAT ALLOWS YOU TO
    COMMUNICATE WITH THE COMPUTER BY PHONE. IT CONVERTS MACHINE LANGUAGE
    SIGNALS INTO ELECTRONIC SIGNALS WHICH IT TRANSMITS OVER THE TELEPHONE.
    ALWAYS CHECK TO ASSURE YOURSELF THE CORD END OF THE PHONE IS CORRECTLY
    MATCHED UP TO THE TOP OF THE MODEM.

NOS - ABBREVIATION FOR THE "NETWORK OPERATING SYSTEM" -- ALL BASIC
    INSTRUCTIONS -- FOR THE CYBER SERIES COMPUTER.

operating system - A SYSTEM (LIKE A LARGE PROGRAM) YOU USE TO OPERATE THE
    COMPUTER -- IT IS NOT hardware, BUT RATHER THE PROCEDURES, ASSUMPTIONS
    AND COMMANDS ABOUT HOW THINGS WILL BE DONE ON THE COMPUTER.

password - YOUR INDIVIDUAL AND NECESSARY WORD-KEY TO BEGIN COMPUTER COMMUNICA-
TIONS TO YOUR TERMINAL. TO OBTAIN YOUR password, CONTACT THE INSTREAM
FLOW GROUP, 2627 REDWING ROAD, FORT COLLINS, CO 80526, (303) 226-9331 OR
CONTACT the CSU COMPUTER CENTER DIRECTLY (303) 491-7395. YOU WILL BE
GIVEN A USER NUMBER TOO.

permanent files - TWO KINDS:

    indirect access - LIAM FILES ARE INDIRECT. WHEN YOU WORK ON YOUR FILE,
    YOU ARE ACTUALLY WORKING ON A LOCAL COPY OF THE FILE WHICH IS ALWAYS
    KEPT IN PERMANENT SPACE.

    direct access - IN CONTRAST, WHEN YOU WORK ON A DIRECT FILE, YOU WORK ON
    THE ONLY COPY OF THE FILE THAT EXISTS AND ANY CHANGES OR ERRORS ARE
    PERMANENT.

printer - A COMPANION MACHINE TO YOUR TERMINAL THAT PRINTS PAPER (i.e., "HARD")
COPIES OF YOUR FILE AT YOUR REQUEST. IT MUST BE CONNECTED TO YOUR
TERMINAL TO PRINT.

program - A SET OF INSTRUCTIONS FOR THE COMPUTER TO FOLLOW.

purge - AN IMPORTANT (AND POSSIBLY DANGEROUS) COMMAND THAT WILL DELETE A FILE
FROM PERMANENT STORAGE IN YOUR ACCOUNT. USE WITH CAUTION. EXAMPLE:
purge,filename.

recoverable job - WHEN YOU ARE UNWILLINGLY CUT OFF FROM THE COMPUTER, WITHOUT
BENEFIT OF logging off YOU CAN CONTINUE THAT JOB BY logging on AGAIN, AT
WHICH TIME, THE COMPUTER, EMBARRASSED THAT IT TERMINATED YOUR RELATION-
SHIP, WILL ASK YOU IF YOU WISH TO RECOVER YOUR PREVIOUS JOB. IT WILL
GIVE YOU THE JSN (JOB SEQUENCE NUMBER) OF THAT JOB, AND ASK YOU TO TYPE
IT (JSN) AT THE APPROPRIATE TIME. ONCE DONE, YOU WILL FIND YOURSELF
PRECISELY WHERE YOU WERE SO RUDELY INTERRUPTED. YOU HAVE TEN MINUTES TO
RECOVER THAT JOB. IF YOU CANNOT RECOVER WITHIN TEN MINUTES, JUST START
THE PROGRAM FROM THE BEGINNING.

ready - A COMPUTER RESPONSE TELLING YOU IT IS WAITING FOR YOUR COMMAND.

replace - A COMMAND TO THE COMPUTER TO TRANSFER A DUPLICATE OF A LOCAL FILE
YOU ARE WORKING WITH INTO AN ALREADY-EXISTING PERMANENT FILE. THIS IS A
HANDY COMMAND TO SAVE YOUR FILES AFTER EACH USE; JUST TYPE replace,your
filename.

revert - A COMPUTER RESPONSE TELLING YOU THE PROGRAM YOU ARE WORKING ON IS
FINISHED. IT IS NOT REPORTING AN ERROR: THE COMPUTER IS 'BACK' INTO ITS
GENERAL OPERATING SYSTEM, WAITING FOR YOUR NEXT COMMAND.

rewind* - A COMMAND TELLING THE COMPUTER TO REWIND ALL OF YOUR FILES BACK TO
THE BEGINNING, OR 'TOP' OF EACH FILE. THE COMMAND rewind,filename WILL
REWIND A SPECIFIC FILE.

rollout,7777 - A COMMAND THAT PUTS THE COMPUTER 'ON HOLD' FOR AS LONG AS 30 MINUTES AT YOUR EXPENSE WHILE YOU TEND TO OTHER MATTERS. YOU CAN TYPE rollout,7777 ANYTIME AFTER A / MARK EXCEPT IN THE -QUERY,,PROGRAM WHERE IT IS NOT AN OPTION.

run - TO MAKE A PROGRAM PERFORM ACCORDING TO ITS INSTRUCTIONS.

rwf - A COMMAND TELLING THE COMPUTER TO REWIND ALL OF YOUR FILES BACK TO THE BEGINNING, OR 'top' OF EACH FILE.

save - A COMMAND THAT ALLOWS YOU TO SAVE A FILE IN PERMANENT STORAGE. USE ONLY ONCE FOR A FILE WHEN IT IS NOT PREVIOUSLY IN PERMANENT STORAGE. REMEMBER THE replace COMMAND CAN BE USED REPEATEDLY TO SAVE YOUR FILE.

status,f - A HELPFUL COMMAND THAT INSTRUCTS THE COMPUTER TO LIST ALL THE FILES CURRENTLY HELD IN LOCAL FILE SPACE. JUST TYPE status,f   [CR]

software - THE PROGRAMS, IDEAS, LISTS, RESULTS AND PROCEDURES FOR WHICH THE hardware IS CREATED.

T - A COMMAND ONLY USED IN xedit MODE THAT PUTS YOU AT THE START OR 'TOP' OF YOUR FILE. TYPE T [CR]

terminal - AN INPUT OR DISPLAY DEVICE THAT LOOKS LIKE A CROSS BETWEEN A TELE-VISION AND A TYPEWRITER AND CONNECTS TO A COMPUTER.

time out - TIRED? INTERRUPTED? THE COMPUTER WILL WAIT UP TO 30 MINUTES FOR YOU. JUST TYPE rollout,777, AND PUT THE COMPUTER ON HOLD. IF YOU ARE DISCONNECTED, log on AGAIN AND ENTER THE recoverable job USERNAME YOU ARE GIVEN BY THE COMPUTER WHEREUPON YOU WILL BE RETURNED TO YOUR PARTICULAR PRE-TIMEOUT PLACE.

user friendly - AN ADJECTIVE USED TO DESCRIBE A COMPUTER AND PROGRAMS THAT DIGEST YOUR INFORMATION AND DATA POLITELY AND AID YOU IN UNDERSTANDING YOUR PARTICULAR PROBLEM.

username and password - YOUR PRIVATE ACCESS KEY TO THE CYBER SERIES COMPUTERS AT CSU. OBTAIN YOURS BY CALLING THE OFFICE OF BERTON LAMB, INSTREAM FLOW GROUP, 2728 REDWING ROAD, FORT COLLINS, CO. (303) 226-9331 OR THE CSU COMPUTER CENTER (303) 491-7395.

wait - A NOTICE TO YOU THAT THE COMPUTER LINE IS BEING CLEARED TO ACCEPT YOUR COMMANDS AND INPUT. USUALLY, THIS MEANS WAITING A FEW MOMENTS.

xedit - AN INTERACTIVE TEXT EDITOR DESIGNED TO CREATE AND MODIFY FILES. WITH THE LIAM PROCESS, YOU WILL USE xedit TO CREATE THE FILE TO STORE ALL YOUR -QUERY,, RESPONSES IN, AS WELL AS THE RESULTING DATA. xedit HAS A DIFFERENT SET OF COMMANDS FROM THE REGULAR batch MODE. THE TWO SIGNALS YOU MUST BE MOST AWARE OF ARE:

"?" WHICH IS xedit's WAY OF TELLING YOU IT IS WAITING FOR YOU TO TYPE INFORMATION (INPUT) INTO YOUR FILE; EVERYTHING TYPED AFTER A ? , WILL BE RECORDED IN YOUR FILE; AND

"??" WHICH IS xedit's WAY OF TELLING YOU IT IS WAITING FOR YOU TO TYPE A COMMAND. THIS SIGNAL IS ANALOGOUS TO THE / NOTATION IN batch.

xon - THIS IS A HANDY SYSTEM COMMAND THAT ENABLES YOU TO STOP AND RESUME LENGTHY COMPUTER OUTPUT ON YOUR SCREEN. WHEN YOU ARE IN batch MODE, TYPE xon AND A CR BEFORE RUNNING A LONG PROGRAM. TO STOP A FILE FROM "SCROLLING" ENDLESS DATA, PRESS YOUR ctrl AND s KEYS SIMULTANEOUSLY; TO RESUME THE DISPLAY, PRESS ctrl AND q KEYS SIMULTANEOUSLY.

/ THIS SLASH IS THE COMPUTER'S NOTATION TELLING YOU IT IS WAITING FOR YOUR INSTRUCTIONS. REMEMBER TO ENTER A CARRIAGE RETURN [CR] AFTER YOUR INSTRUCTIONS.

- THIS DASH IS THE COMPUTER CHARACTER FOR begin. IT NOTIFIES THE COMPUTER TO PREPARE TO RUN A PARTICULAR LIAM PROGRAM, FOR EXAMPLE, -MAPUM,,YOUR FILENAME.

APPENDIX C

TROUBLESHOOTING: Questions and Assorted Remedies

What if ...you are unsuccessful at logging on?

CHECK YOUR MODEM. MAKE CERTAIN IT IS ON AND ATTACHED PROPERLY TO YOUR
TERMINAL. CHECK YOUR USERNAME AND PASSWORD. WHEN YOU ENTER THEM AFTER THE
COMPUTER REQUEST family: , YOU WILL NOT SEE THEM ON YOUR SCREEN AS YOU TYPE
THEM, SO USE CARE IN ENTERING THEM PRECISELY. YOU HAVE THREE TRIES BEFORE THE
COMPUTER WILL DISCONNECT. CHECK YOUR USERNAME AND PASSWORD, MAKING SURE YOU
ARE NOT ADDING OR DELETING ANY COMMAS.

What if ...the computer responds that it is busy when you attempt to log on?

FLIP THE MODEM SWITCH OFF AND ON. WAIT A FEW MOMENTS. REDIAL THE COMPUTER
TELEPHONE NUMBER.

What if ...the computer is printing gibberish (called computer noise) on your
screen while you attempt to enter information?

WHEN THE COMPUTER LINE IS WEAK OR OVERLOADED YOU HAVE LITTLE CHOICE BUT TO log
off AND TRY LATER OR YOU MAY CONTINUE DISREGARDING THE EXTRA LETTERS. SUCH
"NOISE" IS OFTEN MOMENTARY.

What if ...you misspelled a word?

YOU HAVE A FEW OPTIONS DEPENDING ON YOUR COMPUTER HARDWARE:

    1.   PRESS THE [CTRL] KEY AND THE LETTER [H] KEY SIMULTANEOUSLY AND
          MOVE THE CURSOR THE APPROPRIATE NUMBER OF SPACES BACKWARD, THEN
          RE-ENTER THE CORRECT KEYS.

    2.   PRESS THE [DEL] (DELETE) KEY.

    3.   PRESS THE ARROWED BACKSPACE KEY.

    4.   CHECK THE USER'S MANUAL FOR YOUR PARTICULAR TERMINAL.

What if ...you wish to create a file?

SEE PAGE 6.

What if ...you wish to create a second file?

LOG ON WITH YOUR SAME USERNAME AND PASSWORD AND PROCEED AS THOUGH YOU ARE
CREATING YOUR FIRST FILE, PAGE 6.

What if ...you have lost your data set?

TYPE catlist TO SEE WHETHER IT IS IN PERMANENT FILESPACE. RE-ENTER THE PROGRAM
YOU WITH TO RUN WITH YOUR FILENAME AND PRESS A [CR]. TYPE: rwf WHICH WILL
REWIND YOUR FILE. NOW TRY RUNNING IT BY TYPING: -PROGRAMNAME,FILENAME [CR]

What if ...you must leave your terminal for a few minutes?

AFTER A / , YOU MAY TYPE rollout,7777 AND THE COMPUTER WILL 'WAIT' FOR YOU
APPROXIMATELY 30 MINUTES AND THEN LOG YOU OFF AUTOMATICALLY. TYPE: stop [CR]
TO RESUME. rollout,7777 IS NOT APPLICABLE IN THE MIDST OF THE -QUERY,,
QUESTIONNAIRE. This procedure is expensive.

What if ...the computer stops?

"DOWN-TIME" IS TIME THE COMPUTER IS NOT FUNCTIONING. IF THE COMPUTER DISCON-
NECTS FROM YOUR TERMINAL WITHOUT WARNING, YOU HAVE LITTLE CHOICE THAN TO
ATTEMPT TO log on AGAIN. IF YOU SUCCESSFULLY log on WITHIN THE NEXT TEN
MINUTES, THE COMPUTER MIGHT ANNOUNCE recoverable job ON YOUR SCREEN. YOU CAN
RECOVER YOUR PREVIOUS WORK BY ENTERING THE LETTERS AND NUMBERS COMBINATION
THAT THE COMPUTER ASSIGNED YOUR INTERRUPTED JOB. IF YOU WOULD RATHER START A
NEW JOB, TYPE: go [CR]

What if ...your terminal screen reads: READY ?

"READY" IS ANALOGOUS TO THE / NOTATION AND MEANS THE COMPUTER AWAITS A
COMMAND. YOU MAY CHOOSE TO SEE THE -MENU, RUN A PROGRAM, OR CREATE A FILE.
It is less expensive to type BATCH and run in that mode.

What if ...your terminal screen reads: ?? ?

THE DOUBLE QUESTIONMARKS ARE FOUND ON IN xedit. THEY ARE ANALOGOUS TO /
NOTATION IN batch mode. THE COMPUTER IS WAITING FOR YOUR COMMAND, THE MOST
LIKELY OF WHICH WOULD BE input WHICH LETS YOU EITHER CREATE OR ADD TO A FILE.
TO GET OUT OF XEDIT WITHOUT SAVING ANYTHING TYPE: abort [CR]

What if ...your terminal screen reads: ? ?

YOU ARE NOW IN THE input MODE OF xedit WHEN YOU SEE A SINGLE ? . EVERYTHING
YOU TYPE AFTER IT WILL BE RECORDED VERBATIM IN YOUR FILE. WHEN YOU FINISH
ENTERING THE INFORMATION YOU WISH TO RECORD, PRESS CR TWICE.

What if ...the printer is not printing out your file?

CHECK THE COMMUNICATION LINES BETWEEN YOUR TERMINAL, PRINTER AND MODEL. CHECK
THE PRECISE PROCEDURES FOR TRANSFERING INPUT.

What if ...you must choose the size output for your printer when using
-Mapum,, program?

   1)   80 column PRINTS ON 8 and 1/2 INCH PAPER;

2)   132 column PRINTS ON 16 INCH REGULAR COMPUTER SIZE PAPER.

What if ...you wish to see what is in your local filespace?

AFTER A / , TYPE: status,f   [CR]

What if ...you wish to see what is in your permanent filespace?

AFTER A / , TYPE: catlist   [CR]

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. Biological Report 86(9)	2.	3. Recipient's Accession No.

4. Title and Subtitle

A New Perspective in Institutional Analysis: The Legal-Institutional Analysis Model

5. Report Date September 1986

6.

7. Author(s) Leah J. Wilds

8. Performing Organization Rept. No.

9. Performing Organization Name and Address
National Ecology Center
Division of Wildlife & Contaminant Research
U.S. Fish and Wildlife Servcie
2627 Redwing Rd.
Fort Collins, CO 80526-2899

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.
(C)
(G)

12. Sponsoring Organization Name and Address
National Ecology Center
Division of Wildlife & Contaminant Research
Fish and Wildlife Service
U.S. Department of the Interior
Washington, DC 20240

13. Type of Report & Period Covered

14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Legal-Institutional Analysis Model (LIAM) helps an analyst to: (1) develop a better understanding of the biases of the decisionmaking process through which resource decisions are typically made; (2) predict the behavioral patterns which are likely to emerge among organizations in a given conflict; (3) examine the power differentials among those organizations; and (4) develop more effective negotiation strategies for the resolution of instream flow and other water resource conflicts. The model is based upon a synthesis of various social science research concepts, which were themselves developed as part of the continuing effort to understand and explain decisionmaking in the United States. The combined result of the organizational phenomena depicted in these research efforts is that organizational behavior is highly predictable. Prediction is incorporated into the LIAM using the concept of roles. The model allows the user to systematically analyze the political aspects of an agency's abiltiy to achieve its goals in a project negotiation. LIAM is especially useful for assessing an organization's position vis a vis the other agencies involved in a project. Using LIAM, a planner will then be better able to choose the most appropriate strategies for goal achievement, conflict resolution, and negotiation.

17. Document Analysis a. Descriptors

Computer simulation
Management methods
Negotiations
Organization theory

b. Identifiers/Open-Ended Terms

Policy analysis

c. COSATI Field/Group

18. Availability Statement

Release unlimited

19. Security Class (This Report) Unclassified

20. Security Class (This Page) Unclassified

21. No. of Pages 143

22. Price

(See ANSI–Z39.18)   See Instructions on Reverse   OPTIONAL FORM 272 (4–77)
(Formerly NTIS–35)
Department of Commerce

Take Pride in America

Use Natural Resources Wisely

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE